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REPORT ON WATER POLLUTION CONTROL -
GREAT SALT LAKE BASIN, GREAT BASIN
DRAINAGE BASIN

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Water Pollution Series No. 29

Report on
Water Pollution Control
G R E A T S A L T L A K E B A S I N
Great Basin Drainage Basin

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GREAT SALT LAKE BASIN

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INTRODUCTION

The Federal Water Pollution Control Act, Public Law 855, passed by the 80th Congress in June 1948, requires the Surgeon General of the Public Health Service to cooperate with other Federal agencies, with State and interstate water pollution control agencies and with municipalities and industries in the preparation or adoption of comprehensive programs for eliminating or reducing the pollution of interstate waters and tributaries thereof, and improving the sanitary condition of surface and underground waters.

In developing these programs, due regard must be given to improvements necessary to conserve the Nation's waters for public water supplies, propagation of fish and aquatic life, recreational purposes, agricultural, and other legitimate uses.

Recognizing the fact that full technical information was not available to permit the development of such comprehensive programs immediately for most of the Nation's waters, the Public Health Service envisioned the development of a series of reports to cover the interim period prior to the development of comprehensive water pollution control programs. The first of these reports were the Summary Reports which were prepared for the 15 major drainage basins of the country on the basis of information readily available as of July 1, 1950. The second group of reports of this series, of which this is one, are reports on several subdivisions of the country's major drainage areas. Since development of comprehensive water pollution control programs is to proceed as rapidly as conditions permit, only a limited number of these interim Basin reports are to be completed, and the majority of these will be for interstate areas. These reports are based on available data and will provide a reference point for measuring progress, provide a guide to needed additional data, provide a basis for the logical development of comprehensive programs, provide a basis for approval of loans to States, interstate agencies and municipalities at such time as the Congress makes available funds for this purpose, and serve to inform the public on the water pollution control problem and needs for the Basin concerned.

The data on which this report is based have been compiled through and in cooperation with State water pollution control agencies, but should not be considered a detailed engineering investigation of the Great Salt Lake Basin. Through these cooperating agencies additional data have been obtained from other State officials, county and city officials and representatives of industry. Federal agencies also have been of great assistance.

The Basin reports present information about the ways the water resources of the area are used, the pollution entering those water resources and the resulting damages, the benefits which may result from pollution prevention and abatement, pollution prevention measures now in effect, and those which appear to be needed.

Since the Basin reports are based on data which are presently available, they do not discuss the present and future best uses of the waters of the area as such uses are related to pollution control. Such considerations will be included as a part of the comprehensive water pollution programs which will be developed later.

The deficiencies in data and the gaps in information indicated in this Basin report are as significant as the presentation of available facts and statistics. They indicate the work that still needs to be accomplished by water pollution control authorities for the preparation of a comprehensive program.

Data and knowledge now available are sufficient, however, to permit the immediate solution of some of the pollution problems within the Great Salt Lake Basin without awaiting the results of additional surveys and studies.

A sincere effort has been made by all who contributed to this report to present a fair picture of the complex water pollution problems in the Great Salt Lake Basin and to present reasonable conclusions and recommendations. It is our hope that this report, as a step in the cooperative development of an ultimate comprehensive water pollution control program, will help in safeguarding the water resources of this Basin.

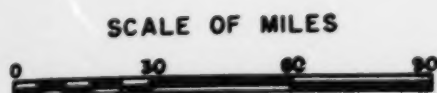
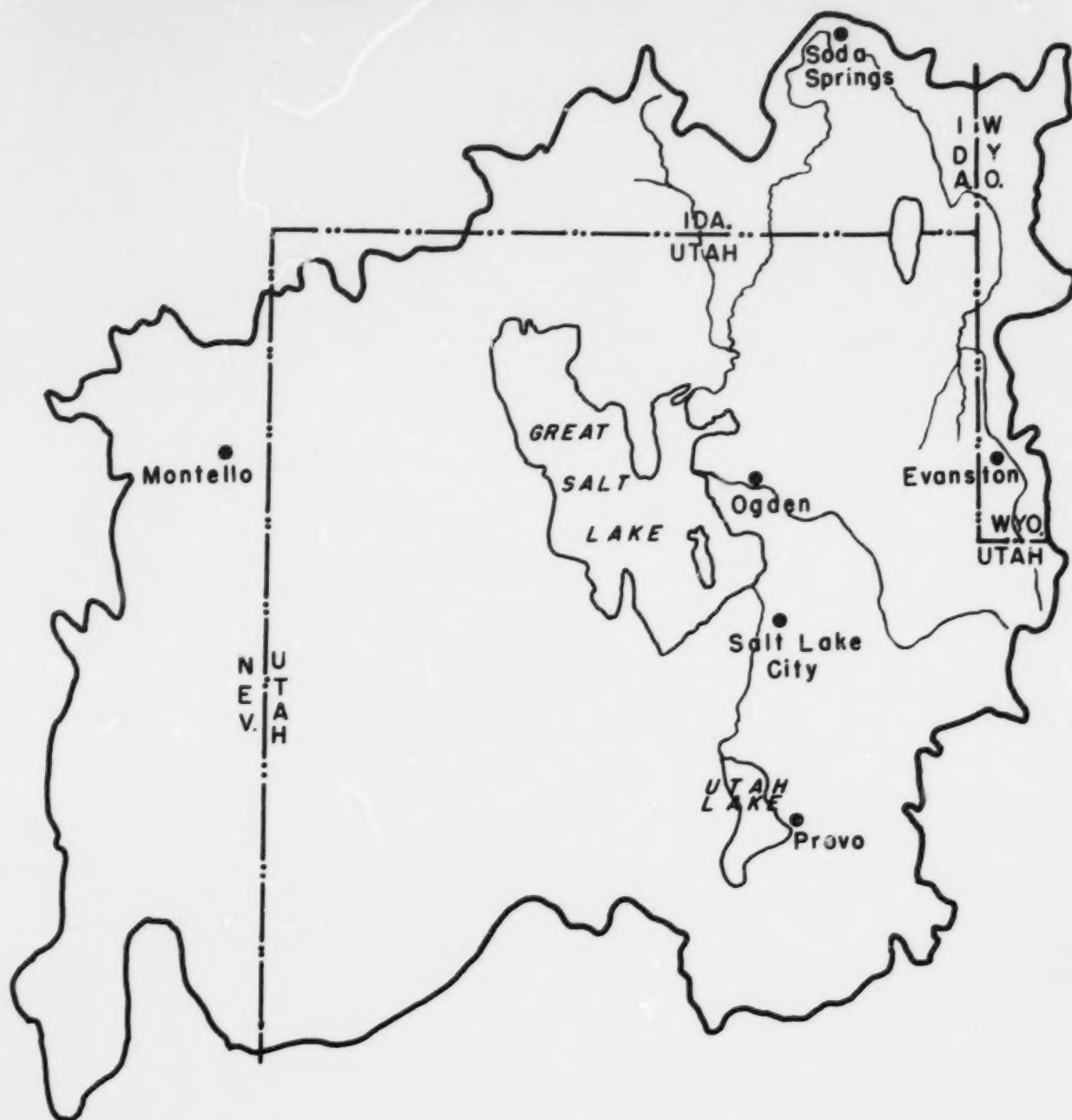
ACKNOWLEDGMENTS

The Public Health Service acknowledges the cooperation and assistance of those agencies and individuals that have contributed to the preparation of this report.

The water pollution control agencies of the States in the Basin, including the Utah State Department of Health, the Nevada State Department of Health, the Idaho State Department of Public Health, and the Wyoming State Department of Public Health, furnished the tabular data and additional material for the narrative sections. These agencies also reviewed a preliminary draft of the report and offered valuable suggestions for its improvement.

The Federal agencies that have given assistance include: the Bureau of Reclamation, Fish and Wildlife Service, and Geological Survey of the Department of the Interior; Bureau of the Census, Department of Commerce; Agricultural Extension Service, Soil Conservation Service, and Forest Service of the Department of Agriculture; and the Corps of Engineers, Department of the Army.

Finally, there is acknowledged the assistance of other State agencies and individuals interested in water resources development and conservation, who have contributed valuable information.



GREAT SALT LAKE BASIN

**FEDERAL SECURITY AGENCY
Public Health Service**

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SUMMARY

The Great Salt Lake Basin is located in the northeast portion of the Great Basin and, though principally in Utah, it includes parts of Idaho, Nevada, and Wyoming. The area of the Basin is approximately 34,800 sq. mi. It includes about 2,500 sq. mi. of water surface, of which Great Salt Lake comprises about 2,200 sq. mi. This lake receives most of the surface runoff of the Basin. The 1950 population of the Basin was approximately 592,000 persons. The principal economic activities are agriculture, stock raising, mining and allied activities, and food processing. Industrial activities are playing an increasingly important part in the Basin's economy. They include a large iron foundry and the largest steel plate rolling mill west of the Rocky Mountains.

The largest use of water within the Basin is for irrigation, there being approximately 750,000 acres of land under irrigation. The State of Utah and the Bureau of Reclamation have 43 projects under consideration which will provide supplemental irrigation water for approximately 165,000 acres and provide approximately 90,000 acres of new land with irrigation water.

The largest project under consideration now is the Weber Basin Project which would increase the useful water supply of the area at canal heads by an average of 238,000 acre-feet annually. Of this supply 198,000 acre-feet would be used to provide a full supply for 50,600 acres of potentially productive land now unirrigated and a partial supply for 27,000 acres now semiproductive because of irrigation water shortages. The remaining 40,000 acre-feet would be used for domestic purposes in communities in Davis and Weber Counties. Other projects under consideration by the Bureau of Reclamation are the Central Utah Project and the Bear River Project.

The quantity of water used in the Basin for domestic and municipal purposes is much less than that used for irrigation. However, the character of this use is such that it is vital to the welfare of the Basin. Most of the water used for domestic supplies comes from springs and wells, or from surface sources high in the mountains above sources of municipal and industrial pollution. Most of these sources of supply have been appropriated and it has become necessary for the growing communities to turn to larger surface sources.

The suitability of these surface waters as sources of water supply depends to a large extent on the sanitary controls exercised over the watersheds. Recent studies of the bacteriological quality of the Weber River indicate high coliform pollution loads in the light of generally accepted criteria as to limiting coliform content for sources of domestic raw water supply. This points to the need for elimination or reduction of pollution contributed to the stream in addition to provision of complete water purification works for safe utilization of these waters for human consumption.

Industrial water supplies, livestock watering, power production, game fishing and recreation are other important water uses.

Periods of low or no stream flow restrict the amount of land that can be irrigated and reduce the waste receiving capacity of the streams. Proposed storage and flood control projects may change the low flow characteristics, and affect the primary water uses and waste treatment requirements.

While pollution effects thus far have generally been limited to specific local areas, increased development of the Basin presents the hazard of pollution of widespread areas or of facilities used by large numbers of people, such as Great Salt Lake, Utah Lake, and numerous attractive canyons located near population centers, some of which are utilized extensively for both winter and summer recreation. Proper control of wastes will be essential to avoid impairment of the public health and welfare. Water pollution has caused fish kills in the past and is reported to have caused wildfowl to migrate to more suitable areas. Water known to be grossly polluted by domestic wastes is used for irrigation and livestock watering. However, information is lacking as to actual impairment of health or of soil damage resulting from the use of this water.

Potential interstate water pollution problems exist at certain points along the Bear River and its tributaries, but no definite determination of the extent of these problems has been made.

Fifty-four communities serving approximately 301,000 persons are known to be discharging raw or partially treated sewage into the Great Salt Lake Basin. The capacity of seven of the sixteen municipal waste treatment plants in the Basin has been considered satisfactory while four plants have been considered inadequate and changes recommended. The adequacy of the capacity of the treatment plants of the remaining five communities has not been determined and must await further study. Five of the sixteen treatment plants are adequately operated, five are inadequately operated, and the adequacy of the operation at six plants is undetermined at this time.

The cost of needed municipal sewage treatment plant construction is estimated at approximately \$5,200,000. This estimate does not include sewer or interceptor construction nor does it consider future growth and subsequent needs.

Of the 114 known industrial sources of pollution, 55 have some type of treatment facilities. Of these 55 existing facilities the adequacy of operation and capacity of 43 are undetermined. There is a great need for comprehensive water pollution control legislation that will enable the water pollution control agencies in the several states represented in the Basin to establish treatment requirements for wastes discharged to the watercourses. Further investigation of the type of wastes discharged by many of the industries, listed in Table 2 under types of industry other than food, will be required.

before sound treatment requirements can be established for their wastes.

Since Great Salt Lake receives the major portion of the water-borne waste of the Basin, its capacity to satisfactorily handle such large quantities of domestic and industrial wastes should be determined. This capacity will, to a large extent, determine the treatment required for approximately one-third of the wastes produced in the Basin, which are discharged directly to the lake.

Pollution prevention program measures have not kept pace with the municipal and industrial growth of the Basin. During the post-war years of 1946 thru 1950 only three municipal sewage treatment plants and six industrial waste treatment facilities were constructed. Benefits from pollution prevention and abatement have been local and have resulted directly from installation of waste treatment facilities by industries and municipalities. A good example of the progress that can be made by industry on a voluntary basis, is the study that has been under way for several months by the Geneva Steel Company with the cooperation of the Utah State Department of Health, Division of Sanitary Engineering. Through changes in plant operation, Geneva Steel has reduced the biochemical oxygen demand of wastes discharged to Utah Lake by approximately 75 percent. Enactment of comprehensive water pollution control legislation by the States in the Basin could benefit the area by providing a sound basis for long range planning, control of water pollution, and conservation of the States' water resources.

Since the Basin includes large desert and semidesert region the protection of water from pollution is especially vital to the economy of the area.

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CONCLUSIONS

1. The largest use of water in the Basin is for irrigation. Domestic and industrial water supplies, livestock watering power production, game fishing and recreation are other important uses.
2. Most of the present domestic surface supply sources are in the mountains, well above usual domestic and industrial pollution sources.
3. At the present time, periods of low flow in the streams limit the amount of land that can be irrigated. Additional reclamation projects are planned to increase the water available for irrigation.
4. While pollution effects thus far have generally been limited to specific local areas, increased development of the Basin presents the hazard of pollution of widespread areas or of facilities used by large numbers of persons.
5. Sewage is discharged to the interstate Bear River in Wyoming before the stream enters Utah, and sewage and industrial wastes are discharged to a tributary of the Bear River in Idaho before it crosses over into Utah. Field investigations have not been made for evaluation of the downstream effects of these wastes.
6. Water known to be grossly polluted with domestic sewage is used for irrigation and livestock watering.
7. Comprehensive planning and consideration of the views of all concerned have not progressed sufficiently to permit an evaluation of the best ultimate usage for the water resources of the Basin.
8. The domestic wastes of 54 communities are discharged to the watercourses of the Basin. The sewage from over 90% of the sewered population does not receive treatment.
9. There are 114 known industrial sources of pollution in the Basin. Only 55 of the 114 industries contributing wastes provide even minor treatment. Data secured to date on industrial plants are not adequate to draw definite conclusions as to treatment requirements.
10. Great Salt Lake is the ultimate receiving water for the major portion of the surface runoff waters of the area, and therefore eventually receives nearly all of the waterborne waste in the Basin. The capacity of Great Salt Lake to assimilate these wastes has not been determined.

11. Fish have been killed in areas directly below certain of the waste outfalls.
12. As water is a critical item in the economy of the Basin, it must be conserved wherever possible, both in quality and quantity.
13. There is a need for enactment of comprehensive water pollution control legislation, or adoption of comprehensive regulations based on the existing statutes in the states of the Great Salt Lake Basin.

RECOMMENDATIONS

1. Epidemiological studies should be undertaken to ascertain the hazards associated with the use of sewage polluted waters for irrigation and livestock watering.
2. The present good quality of domestic surface supply sources that are located in the mountains above domestic and industrial sources of pollution should be maintained by their protection from the possible encroachment of pollution.
3. Proposed reservoirs should be operated insofar as possible to contribute to the control of pollution. If water pollution control authorities could be provided with an advance schedule of releases, fullest use of the self-purification capacities of the streams could be achieved.
4. Water pollution now viewed as having only local effects should be reviewed and control measures instituted where necessary to protect the rights of the downstream water users and to prevent pollution from spreading over larger areas and endangering the public health.
5. If significant pollution of interstate waters is recognized or develops in the Basin, the resulting problems should be given joint consideration by the State water pollution control agencies of the States concerned for the establishment of a mutually satisfactory control program.
6. A study of the water uses of the streams in the Basin should be made to evaluate the ultimate best usage of the streams.
7. The program of surveys covering industrial and municipal waste disposal should be continued so that type and degree of treatment needed may be determined for these wastes.
8. The capacity of Great Salt Lake to handle domestic and industrial wastes should be determined.
9. Water quality criteria should be established for beneficial water uses as a basis for establishment of necessary pollution corrective and control measures.
10. Those States represented in the Basin not having comprehensive water pollution control laws or regulations should enact such legislation or promulgate appropriate regulations at the earliest opportunity as an additional tool for conservation of the water resources of the Basin.

GENERAL DESCRIPTION

Historical Background

During the Pleistocene age the Great Salt Lake Basin was largely covered by water, the present Great Salt Lake being only a shrunken remnant of that once vast inland sea. Although it is doubtful that Capt. Benjamin Bonneville ever entered the Pleistocene lake-bed, it was given the name Lake Bonneville in his honor.

The Spanish entered the Basin several times but they made no attempt to develop or colonize the area. In 1776, Father Silvestre Vilez de Escalante's party set out from Santa Fe to find an overland route to the California missions. During his travels he came upon a large lake and applied the name "Yuta" in honor of the Indians that lived along the lake shores. However, Father Escalante did not learn of Great Salt Lake, which was discovered later under circumstances which are still a matter of dispute.

Weber River, second largest in the Basin, is thought to be named for Capt. John G. Weber, who claimed to have joined General Ashley as a trapper in 1823. However, the Weber was also called Weaber and Weaver at various times and may have originally been named for Pauline Weaver, a noted Arizona frontiersman.

Jedediah S. Smith and Peter Skene Ogden entered the Basin in 1825 and after reaching the Bear River north of Great Salt Lake, Smith travelled north and Ogden went south. Ogden located the town of Ogden's Hole at the present site of Ogden and named the Ogden River. Meanwhile, Etienne Provot, a young French-Canadian employed by General William H. Ashley, was exploring the area around Utah Lake and Provo River which was named in his honor.

In July 1847, an advance party of immigrants of the Latter Day Saints Church arrived at the present site of Salt Lake City. They immediately prepared for the coming winter and on July 23, 1847, diverted water from City Creek upon the sun-baked soil of what is now the business district of Salt Lake City. This was the beginning of systematic irrigation in the State of Utah. Territorial laws of 1852 made water public property to be used for public benefit. Later statutes modified this doctrine in the interest of private rights with the State placed as regulator and referee. Under wise leadership the early settlers transformed waterless wastelands into fertile, productive farms and beautiful, well planned cities.

In 1848, the provisional State of Deseret was founded and the Congress of the United States was petitioned for statehood. The petition was denied but the territory of Utah was chartered, the name of the initial Indian inhabitants being given to the territory. After a long struggle and several reductions in the size of the original territory, Utah was admitted to the Union as a State in 1896.

Physical Description

Geography - The Great Salt Lake Basin comprises a land area of over 32,356 sq. mi. situated in the northern section of the Great Basin. In the Pleistocene period, Lake Bonneville submerged the Basin, covering the present site of Salt Lake City to a depth of 850 feet. The Basin is roughly diamond shaped with a major axis of about 225 miles extending from northeast to southwest. It lies between 39° and 43° north latitude and 111° and 115° west longitude. The eastern boundary of the Basin extends southward from the Salt River Mountain Range in Wyoming along the Bear River Divide to the eastern end of the Uinta Range in Utah. The Divide extends southwest to Mt. Nebo Range from whence it passes around the Tintic Mountains, along the Kern Mountains, the southern tip of Antelope Range, and the northern tip of Shell Creek Range to Egan Range. The western boundary is along Egan Range, the Cherry Creek Mountains, and Pequop Range into high elevations of the Continental Divide separating this drainage from the Columbia River drainage to the north. The northerly boundary extends northeast along this divide into the Grouse Creek Mountains of Utah and generally northeast to the Aspen Range in Idaho, thence eastward to the Aspen Range in Wyoming.

The total area of over 34,800 sq. mi. includes 2,500 sq. mi. of water surface, most of which is in Utah. Great Salt Lake, with an area of approximately 2,200 sq. mi., provides the major portion of this water surface. It is the largest inland salt water lake in the world. All surface waters of the basin drain toward it and escape only through evaporation or percolation into underground storage. Approximately 23,868 sq. mi. or 68.5 percent of the Basin is in Utah, 6,041 sq. mi. or 17.3 percent is in Nevada, 3,387 sq. mi. or 9.7 percent is in Idaho, and 1,560 sq. mi. or 4.5 percent is in Wyoming. (Table 6, Appendix)

Topography - Practically all the water flowing into Great Salt Lake comes from streams draining the western slope of the Wasatch Mountains and the western end of the Uinta Range.

Bear River, the Western Hemisphere's largest stream not reaching the ocean, originates high in the Uinta Mountains in Utah. It flows northward through Utah and Wyoming, crossing these state lines three times, then west into Idaho, and turns south again into Utah to discharge into Great Salt Lake only 90 mi. from its source after meandering approximately 500 mi.

The Weber and Provo Rivers also originate in the Uinta Mountains and flow westward through deep valleys in the Wasatch Range. Weber River is about 135 mi. long and discharges into Great Salt Lake while Provo River is about 70 mi. long and discharges into Utah Lake.

The important streams which rise in the Wasatch Mountains are Ogden River, a 35-mi. long tributary to Weber River, and Spanish Fork River that is 45 mi. long and discharges into Utah Lake.

Jordan River, which joins Utah Lake with Great Salt Lake, was so named because of its similarity to the river in Palestine which joins the Sea of Galilee with the Dead Sea. It has a small flow composed of surface drainage (return irrigation water), a few small tributary mountain streams, and water pumped from Utah Lake to satisfy downstream water rights.

Small but important streams drain the western slopes of the Wasatch Range. The water in these streams is nearly 100 percent appropriated for either municipal or irrigation water supplies.

Streams in the Basin vary from a 1,200-foot per mi. slope in the upper mountain tributaries to a one-foot per mi. slope in the lower reaches of the Jordan River. Flat slopes and low stream flows prevail below the major sources of pollution.

The Basin lies at elevations of over 4,200 feet above sea level with mountains in the Wasatch and Uinta Ranges in the Southeast corner peaking above 12,000 feet. The continuous mass of mountains in the eastern portion of the Basin is precipitous and serrated by many narrow valleys. At an elevation of about 4,700 feet the eastern mountains break sharply and slope gently to the level of Great Salt Lake. Mountains in the north and west portions of the Basin are slightly lower, less continuous, and less rugged.

The most prominent mountain ranges in the Basin are the Wasatch and western end of the Uintas in the eastern portion, and the Oquirrh on the western edge of Great Salt Lake Valley. Drainage from both eastern and western slopes of the Wasatch and Oquirrh Ranges is to Great Salt Lake.

The Basin has a wide variety of valleys. The broad, relatively flat Great Salt Lake Valley provides a large portion of the fertile, highly productive farm land of the Basin while the narrow, scenic canyons which radiate from Salt Lake City and Ogden provide domestic and industrial water supplies as well as areas for recreational use.

The Basin has numerous small glacial lakes in the mountains. Its larger fresh water lakes are Utah Lake and Bear Lake.

Geology - The formations of the northeastern rim of the Basin range from the oldest Archean rocks to recent sediments. Much of the western slope of the Wasatch Range from Ogden south to Mueller Park and the mountains in northwestern Utah are of ancient pre-Cambrian rock. Flanking these rocks is a thick series of Paleozoic quartz and limestone. The bowl shaped, folded formations east of Salt Lake City are composed of shales, limestones, and sandstones.

Tertiary lavas make up the mountain range crossing between Great Salt Lake and Utah Lake. In this range, the Jordan River has cut down to and exposed Tertiary and Pleistocene marlstones. West of Great Salt Lake is the Great Salt Lake Desert, much of which is covered by salt flats. The salt cake has an average thickness of four to five feet. This cake was formed through the evaporation of ancient Lake Bonneville, a lake which played an important part in the geological development of the valley floors in the Basin. Rising from the valley floors are isolated mountain ranges composed chiefly of quartz and limestone.

The separating action which took place during the life and shrinking of ancient Lake Bonneville has established graded alluvial deposits across the present Basin floor. These deposits range in size from large rocks high on the mountain slopes to fine silts in the lowest levels, and range in thickness up to 1,000 feet. They provide extensive ground water storage capacity.

Present geologic activity includes the formation of calcium deposits, being precipitated with the aid of algae, on the floor of the Great Salt Lake.

Climate - The climate of the Basin is typically continental with wide seasonal and diurnal variations. High mountain valleys experience rigorous winters. Temperatures in the lower valleys are more moderate, seldom below zero or above 100° F. The valley areas immediately west of the Wasatch Mountains have the mildest climate. Temperatures are in general related to altitude rather than latitude. The average annual temperature of the Basin is 48° F., the average being slightly higher in the valleys and lower in the mountains. The temperature cycles are quite consistent, with any consecutive five-year mean varying only slightly from the long time mean.

Precipitation varies from a maximum of 30 to 40 in. in the southeastern portion of the Basin to a practically negligible minimum in the deserts of the western portion. The annual average precipitation in the Basin is only 12 in. As in most western areas, there are distinct wet and dry seasons and the dry season most nearly coincides with the growing season. Dry farming is practiced in many areas, but irrigation is necessary for high income, diversified agriculture.

Growing seasons vary from a minimum of 54 days at Woodruff, the coldest spot in the Basin, to a maximum of 194 days at Saltair. The season in the most productive area varies from Salt Lake City's average of 187 days to the 122-day average at Provo.

The natural vegetative cover of the Basin varies widely in type as influenced by soils and climate. There is relatively no cover on the salt flats and deserts. Grasses and sedges predominate in the moist valley bottoms and mountain meadows. Sagebrush and

greasewood predominate in the drier soils. Brush grows on the mountain slopes and in canyons. Deciduous trees such as cottonwoods, maples and willows grow along the watercourses, and conifers such as alpine fir, Douglas fir, spruces, and lodge pole and ponderosa pines are found in the high mountains. Juniper and pinon grow in mountainous soils too rocky and dry to support other species.

Hydrology - The slopes in the eastern part of the Basin, where nearly all of the moisture is collected, are steep and the runoff is very rapid allowing little percolation into underground storage. However, the mountains are high enough that most of the moisture is precipitated as snow. During the summer the melting snow provides a good supply of surface water throughout the area along the eastern edges of Great Salt Lake.

Three of the more important man-made controls on the rivers of the Basin are Deer Creek Dam on the Provo River, Echo Dam on the Weber River, and Pineview Dam on the Ogden River. As these dams impound water for irrigation, the flow below the structures is quite low for a period of several months each year. During this period, domestic and industrial wastes that are discharged to these stream sections of exceptionally low flow receive little dilution. Proposed flood control and irrigation reservoirs, power developments, etc., may further alter the regimen of the streams if and when they are constructed.

The hydrological records for the streams of the Basin were studied and certain summary data for key points are given in Table 3, Appendix. Maximum and minimum flows for the period of record show the extreme values and therefore the degree of fluctuation in flow. Columns six and seven of this table, which present data on lowest mean monthly flows and the lowest mean flow for seven consecutive days, are particularly valuable for purposes of evaluating water pollution problems, especially in determining the degree of treatment required for wastes discharged to a watercourse. Information on flood or peak flows may also be of importance, if such flows are to be utilized for disposal of stored or ponded wastes.

Economic Development

During the period from 1900 to 1950, the population of the Basin increased from 228,228 to 592,228 (159 percent), while the population of the State of Utah increased from 276,749 to 686,797 (149 percent). The population of the Basin is distributed among the four States as follows: Utah, 94.1 percent; Idaho, 4.6 percent; Wyoming, 0.9 percent; and Nevada, 0.4 percent. (Tables 4 and 5, Appendix)

Most of the population is concentrated in the Great Salt Lake

area, with approximately 46 percent of the total Basin population in Salt Lake County, Utah. There are only four cities in the State of Utah with a population of 10,000 or more. They are Salt Lake City, 181,718; Ogden, 56,910; Provo, 28,899; and Logan, 16,802. These cities are included within the boundaries of the Great Salt Lake Basin. American Fork, Bountiful, Brigham City, Murray, Orem, South Salt Lake, Spanish Fork, Springville, and Tooele are cities of the Basin with 1950 populations of from 5,000 to 9,000.

The economic expansion of the Basin, encouraged by Federal expenditures during and just prior to World War II, resulted in extensive industrial development. The transition from an agricultural to an industrial economy which is underway makes reliable population forecasting difficult. Forecasts indicate increases of 50 to 100 percent in certain areas during the next 50 years. Rural populations have been on the decline but are expected to remain at the present level. The major area of anticipated growth is along the Wasatch Front from Brigham City in the north to Provo in the south.

The production of fruits, vegetables and field crops, and the raising of cattle, sheep, hogs, and poultry comprise the principle agricultural activities of the Basin. Major industries include fruit and vegetable processing plants, milk handling and processing plants, meat packing and processing plants, mining and milling, sugar refining, iron and steel manufacture, and copper and petroleum refining.

The value of mining and metal products accounts for about 45 percent of the total production of the Basin while food production and processing accounts for approximately 31 percent.

Most of the manufacturing industries of the State are centered in the Ogden and Salt Lake City areas, one notable exception being the relatively new Geneva Steel Company plant at Provo which has a blast furnace capacity of 1,150,000 net tons of pig iron annually. This plant can produce a total of 1,500,000 net tons of steel ingots. The capacity of the plate rolling mill is 700,000 net tons annually which now places Utah fourth in the nation in production of steel plate.

In the opinion of Dr. Elroy Nelson, Director of the Bureau of Economics and Business Research at the University of Utah, the oil industry might easily become the largest industry of Utah. At present most of the oil refineries in Utah are located in this Basin. It has been estimated that in 1951 these refineries will handle approximately 22,500,000 barrels of crude oil. This estimate is based on the production figures for the first seven months of the year.

Many of the products of the Basin are shipped to out of state markets, some of the more notable being poultry and dairy products, beef cattle, wool, nonferrous metals and steel plate.

The seasonal demand for labor in the area is quite small with a drop in the number employed on construction jobs during the winter months. Persons engaged in livestock and poultry raising, dairying and similar enterprises are largely self-employed and require little assistance from outside labor.

In September, 1950, the total labor force of the Basin was estimated at 157,000, with 119,000 engaged in industry, 32,200 in agriculture, and 5,800 unemployed.

Of the 8,212,500 acres that comprise the more than 22,500 farms in the portions of Utah, Idaho, Wyoming and Nevada that make up the Great Salt Lake Basin, only 1,807,000 acres or 22 percent are cultivated croplands. The remaining 78 percent or 6,405,500 acres are range or non-cultivated lands.

The following is an approximate breakdown of the farm sizes:

<u>Farm Size</u>	<u>Percent</u>
Under 10 acres	14.8
10 to 50 "	31.6
50 to 100 "	19.1
100 to 200 "	13.2
200 to 400 "	10.3
400 to 700 "	4.9
Over 700 "	6.1

Almost 50 percent of the farms in the Basin contain 50 acres or less. The majority of the small farms are irrigated and produce high value crops such as fruits and fresh vegetables, while the larger acreages are predominantly dry farms or cattle ranches. There has been little agricultural expansion in the Basin during the last several decades and intensified crop production has helped offset the demands of the population growth; however, expansion of the cropland acreage will be necessary to meet future population growth resulting from industrial expansion.

Utah has a great variety (in all 210) of commercial mineral resources, certain of which are vast in extent. Copper, gold, silver, molybdenum, lead, zinc, coal, magnesium, potassium, arsenic, antimony, phosphate rock, tungsten, garnet, mercury, bismuth, silica and many others occur in the Great Salt Lake Basin. The principal mineral resources that are being exploited are nonferrous metals, salt, potash, and phosphate rock.

Although the mountain areas of the Basin are covered by irregular tracts of timber, much of the growth is either noncommercial or inaccessible. The forests make a material contribution to the Basin by providing excellent watershed cover and grazing areas. The small percentage of timber that is commercially accessible provides for about 40 percent of the Basin needs.

There is very little oil produced within the limits of the Basin. However, there are several refineries, notably the Utah Oil Refining Co., Western States Refinery, Phillips Refinery and the refinery of the Standard Oil Co. of California, all of which process oil that is produced in other parts of the State and adjoining states.

There are 13 municipally owned and operated hydroelectric power plants in the Basin. There are also 26 small, privately owned hydroelectric plants with a capacity of 176,000 kilowatts. A large percentage of the rural population is served by electricity.

The Bureau of Reclamation has three new generating plants under consideration, two in connection with the Weber River Project and one at Deer Creek Reservoir on the Provo River. These stations are to have a total installed capacity of 13,400 kilowatts.

The principal fish and wildlife resources of the Great Salt Lake Basin are in the mountains and foothills. The Bird Refuges along the lake shore are the notable exceptions. Situated near the centers of population on the eastern side of the drainage area, they are subject to intensive use.

According to M. J. Madsen of the Utah State Fish and Game Commission, there are 62 species of fish in Utah and presumably most of them are represented in this Basin. The principal sport fish are rainbow trout, cutthroat trout, and brown trout. The fishery also includes bluegills, lake trout, and large-mouth bass. There are many miles of clear mountain trout streams and numerous lakes and reservoirs that combine to provide an exceptionally valuable recreational asset.

Waterfowl are a major attraction to tourists and hunters from distant places and a valuable source of revenue to the State. Three major migratory waterfowl refuges lie within the Basin, namely, Ogden Bay Refuge and Farmington Bay Refuge owned and operated by the State of Utah, and the relatively large Bear River Migratory Waterfowl Refuge (approximately 64,900 acres) administered by the U. S. Fish and Wildlife Service.

The pheasant is the most important game bird in Utah, hunters numbering approximately 100,000 annually. There are eight upland Game Bird Sanctuaries, and one Upland Game Bird Research Project is in progress at the Utah State Agricultural College in Logan.

The big game resources of the State are intelligently harnessed and efficient game management practices are employed within the limits of budgetary requirements. The estimated 1949 deer population was over 220,000 as compared to 8,400 in 1916 and the 1949 elk herd, which consisted of but a small native remnant in 1916, totaled approximately 4,500 head. Range forage conditions receive careful attention in the game management program, the numbers in the herds being regulated to assure a minimum of damage to agricultural crops.

USES OF WATER RESOURCES

The 1950 population of the Great Salt Lake Basin was about 592,000, an estimated 85 percent of the people residing in communities of 50 or more persons. Nearly all of these communities draw their domestic water supplies from springs or wells. The springs are usually found in or adjacent to the mountain ranges, and are fed by melting snow on the mountain slopes. The watersheds and springs are generally well removed from human habitation.

Some of the towns use well water alone while others using spring supplies have supplemented these supplies with well water. These wells are developed in water-bearing strata in the valleys and are from 50 to several hundred feet deep. The water that feeds the wells ordinarily originates in melting snow and surface runoff which enters the water-bearing strata through outcroppings in stream beds and near mountain slopes. In such cases, the distance and degree of filtration from point of origin to the well is usually sufficiently great to insure a water of safe sanitary quality.

In parts of the Basin spring and well supplies have not been readily available or of sufficient quantity, hence some cities have found it necessary to develop surface water supplies. To meet increasing requirements, Salt Lake City planned to secure additional water from Deer Creek Reservoir on Provo River. The Salt Lake Metropolitan Water District, which serves Salt Lake City, has acquired 46 percent of the Deer Creek water supply and water is now being delivered from the reservoir into the city water mains. Plans are underway at the present time to develop water from Weber River as a domestic supply for towns in Weber and Davis Counties. Provision has also been made in the Central Utah Project to supply domestic water to communities in Utah and South Salt Lake counties.

The use of surface supplies for domestic purposes will undoubtedly increase to meet growing requirements. The suitability of surface water supplies for domestic use will depend to a large extent on the sanitary control exercised over the watersheds. Recent studies of the bacteriological quality of the Weber River indicates high coliform pollution loads in the light of generally accepted criteria as to limiting coliform content for sources of domestic raw water supply. This points to the need for elimination or reduction of pollution contributed to the stream in addition to provision of complete water purification works for safe utilization of these waters for human consumption.

The states represented in this Basin do not now have comprehensive water pollution control legislation or comprehensive water pollution control regulations based on the existing State statutes. The adoption of comprehensive legislation or adequate regulations at the earliest opportunity and their effective application will be a great step forward in assuring surface waters of suitable quality for domestic supplies.

The accompanying tabulation of municipal water supplies in the

MUNICIPAL WATER SUPPLIES IN
GREAT SALT LAKE BASIN

<u>Town</u>	<u>Population</u>	<u>County</u>	<u>State</u>	<u>Source</u>	<u>Treatment</u>
Alpine	444	Utah	Utah	Springs	None
Analga	246	Cache	"	Wells	"
American Fork	5124	Utah	"	Springs	"
Bacchus	166	Salt Lake	"	Wells	Chlorination
Bear River	429	Box Elder	"	Springs	None
Bennington	180	Bear Lake	Idaho	Well, Spring	"
Bingham Canyon	2570	Salt Lake	Utah	Mine, Stream	"
Bloomington	385	Bear Lake	Idaho	Spring	"
Bluffdale	350	Salt Lake	Utah	Streams	"
Bountiful	5969	Davis	"	Stream, Wells	Chlorination
Brigham City	6777	Box Elder	"	Spring, Wells	None
Clarkston	579	Cache	"	Springs	"
Clifton	200	Franklin	Idaho	"	"
Clinton	1053	Davis	Utah	"	"
Coalville	949	Summit	"	Springs, Wells	"
Conda	300	Caribou	Idaho	Springs	"
Copperfield	1132	Salt Lake	Utah	Stream, Mine	"
Copperton	779	"	"	Stream, Mine, Wells	"
Corinne	411	Box Elder	"	Spring	"
Cornish	221	Cache	"	Springs, Tiledrain	"
Croydan	107	Morgan	"	Springs	"
Dayton	350	Franklin	Idaho	"	"
Delta	1304	Tooele	Utah	Spring, Wells	"
Devils Slide	252	Morgan	"	Springs	"
Deweyville	256	Box Elder	"	"	"
Draper	1444	Salt Lake	"	Stream	"
East Layton	124	Davis	"	Springs	"
Echo	163	Summit	"	"	"
Elberta	150	Utah	"	"	"
Enterprise	619	Morgan	"	"	"
Evanston	3800	Uinta	Wyoming	Stream, Wells	Chlorination
Fairfield	110	Utah	Utah	Springs	None
Fairview	500	Franklin	Idaho	"	"
Farmington	1468	Davis	Utah	Stream	Chlorination
Fielding	329	Box Elder	"	Springs	None
Franklin	600	Franklin	Idaho	"	"
Garden City	261	Rich	Utah	Stream, Springs	"
Garfield	2123	Salt Lake	"	Wells	"
Garland	1008	Box Elder	"	Springs	"
Genola	325	Utah	"	"	"
Georgetown	350	Bear Lake	Idaho	Wells	"
Goshen	616	Utah	Utah	Springs	Chlorination
Grace	800	Caribou	Idaho	Spring, Well	None

<u>Town</u>	<u>Population</u>	<u>County</u>	<u>State</u>	<u>Source</u>	<u>Treatment</u>
Grantsville	1536	Tooele	Utah	Stream	Chlorination
Grouse Creek	300	Box Elder	"	Springs	None
Heber	2929	Wasatch	"	"	"
Henefer	335	Summit	"	"	"
Herriman	289	Salt Lake	"	"	"
Honeyville	596	Box Elder	"	"	"
Howell	70	" "	"	"	"
Hoytsville	300	Summit	"	"	"
Huntsville	496	Weber	"	"	"
Hyde Park	696	Cache	"	"	"
Kyrum	1702	"	"	"	"
Kamas	683	Summit	"	"	"
Kaysville	1899	Davis	"	Stream, Springs	Chlorination
Laketown	370	Rich	"	Springs	None
Lark	517	Salt Lake	"	Mine, Tunnel	"
Layton	3454	Davis	"	Stream, Well, Spring	Chlorination
Laytona	356	"	"	Stream	None
Lohi	3636	Utah	"	Springs, Well	Chlorination
Lewiston	1531	Cache	"	Spring, Canal	"
Lindon	587	Utah	"	Springs, Well	None
Logan	16,802	Cache	"	Springs, Canal	"
Magna	3532	Salt Lake	"	Wells	"
Malad	3000	Oneida	Idaho	Wells, Springs	Chlorination
Mantua	319	Box Elder	Utah	Springs	None
Mapleton	1175	Utah	"	"	"
Marion	50	Summit	"	"	"
Mendon	454	Cache	"	"	"
Midvale	3975	Salt Lake	"	Stream, Springs, Well	Chlorination
Midway	801	Wasatch	"	Springs	None
Millville	439	Cache	"	"	"
Milton	250	Morgan	"	Wells	"
Mink Creek	180	Franklin	"	Spring	"
Montello	300	Elko	Nevada	Springs	"
Montpelier	3300	Bear Lake	Idaho	Stream, Wells	Chlorination
Morgan	1078	Morgan	Utah	Springs, Wells	"
Murray	8998	Salt Lake	"	Stream, Spring, Well	None
Newton	549	Cache	"	Springs	"
Nibley	271	"	"	"	"
North Logan	423	"	"	"	"
North Ogden	1103	Weber	"	"	"
North Salt Lake	515	Davis	"	"	"
Oakley	305	Summit	"	"	"
Ogden	56,910	Weber	"	Stream, Spring, Well	Chlorination
Ophir	300	Tooele	"	Stream	None
Oren	8338	Utah	"	Canal, Spring, Well	Chlorination

<u>Town</u>	<u>Population</u>	<u>County</u>	<u>State</u>	<u>Source</u>	<u>Treatment</u>
Oxford	50	Franklin	Idaho	Spring	None
Paradise	500	Cache	Utah	Springs	"
Park City	2249	Summit	"	Mine, Spring	Chlorination
Paris	1100	Bear Lake	Idaho	Stream	None
Payson	3979	Utah	Utah	Springs	"
Peca	200	Summit	"	"	"
Perry	383	Box Elder	"	Spring, Well	"
Peterson	56	Morgan	"	Stream	"
Pickleville	87	Rich	"	Spring	"
Pleasant Grove	3183	Utah	"	"	"
Plymouth	292	Box Elder	"	"	"
Portage	342	" "	"	"	"
Portersville	150	Morgan	"	"	"
Preston	4000	Franklin	Idaho	"	Chlorination
Providence	1520	Cache	Utah	"	None
Provo	28,899	Utah	"	Stream, Spring	Chlorination
Randolph	656	Rich	"	Spring	None
Richmond	1088	Cache	"	"	"
Richville	60	Morgan	"	"	"
Riverdale	150	Weber	"	Well	"
Riverton	1663	Salt Lake	"	Stream	"
River Heights	288	Cache	"	Well	"
Roy	3709	Weber	"	Springs, Well	"
Salt Lake City	181,718	Salt Lake	"	Streams, Well, Mine	Chlorination
Sandy	2092	" "	"	Spring, Well, Stream	"
Santaquin	1206	Utah	"	Springs	None
Smithfield	2383	Cache	"	"	"
Snowville	195	Box Elder	"	"	"
Soda Springs	1300	Caribou	Idaho	"	"
Soldier Summit	97	Wasatch	Utah	Stream	"
South Jordan	1046	Salt Lake	"	Well	"
South Ogden	3764	Weber	"	Streams	Chlorination
South Salt Lake	7668	Salt Lake	"	Wells	None
South Weber	259	Davis	"	Springs	"
Spanish Fork	5227	Utah	"	"	"
Spring Lake	310	"	"	"	"
Springville	6481	"	"	"	"
Stockton	232	Tooele	"	Stream	"
Sunset	276	Davis	"	Spring, Wells	Chlorination
Syracuse	732	"	"	Well	None
Taylorsville	680	Salt Lake	"	Stream, Wells	Chlorination
Thatcher	125	Box Elder	"	Well	None
Tooele	7265	Tooele	"	Spring, Wells	"
Tremonton	1630	Box Elder	"	Springs	"
Trenton	553	Cache	"	"	"
Uintah	264	Weber	"	"	"
Union	811	Salt Lake	"	Spring, Stream, Well	Chlorination

<u>Town</u>	<u>Population</u>	<u>County</u>	<u>State</u>	<u>Source</u>	<u>Treatment</u>
Vernon	100	Tooele	Utah	Wells	None
Wanship	68	Summit	"	Springs	"
Wallsburg	233	Wasatch	"	"	"
Wellsville	1242	Cache	"	"	"
Wendover	300	Tooele	"	Stream, Springs	Chlorination
Weston	400	Franklin	Idaho	Springs	None
West Jordan	2107	Salt Lake	Utah	Stream, Wells	Chlorination
West Point	236	Davis	"	Well	None
Whitney	250	Franklin	Idaho	Springs	"
Willard	541	Box Elder	Utah	Springs, Well	"
Woodland	50	Summit	"	Springs	"
Woodruff	241	Rich	"	"	"
Woods Cross	211	Davis	"	Stream, Well	Chlorination

Basin shows that 28 municipalities provide chlorination and that none provide filtration for their public water supplies. Thus far the majority of the streams used for domestic water supplies have been relatively free from bacterial contamination, and simple chlorination has been sufficient to render the water safe for human consumption. However, this condition is rapidly changing in many sections of the Basin, due to the increased use of the watershed areas for recreational activities.

In a recent report on the Salt Lake City water supply, it was pointed out that contamination had increased to such an extent that chlorination alone was no longer adequate to insure a safe water supply from one of the surface streams (City Creek) now used by the city. The report recommended that improvements be made in the sanitation control of the watershed, and that complete treatment be provided including pre-chlorination, coagulation, rapid sand filtration, post chlorination and ammoniation.

The present spring supplies in the Utah portion of the Basin have all been appropriated. In many cases, these supplies are of sufficient capacity to meet a reasonable expansion in population and increased water demands. There are, however, a number of towns which would be faced with a water shortage should a rapid expansion in population occur as the result of an increase in the demand for labor as the defense effort progresses.

Many of the smaller communities could possibly supplement their present supplies by drilling wells. However, a great many of the industries in the Basin obtain their water supplies from wells and there is uncertainty as to the extent additional supplies could be drawn from this source for domestic use before the aquifers would be overdrawn.

The larger cities and towns are looking toward surface water sources to augment their present supplies. The need for additional water will increase as the area grows in serving its function in the defense effort. Ogden, Utah, is one of the principal rail centers between the east and west, and handles much of the freight that is shipped from the east to the central and northern portions of the west coast. A large Army Quartermaster Depot is located near Ogden as well as Hill Field where B 29's are stationed. These military installations as well as other defense activities will place an increased load upon the water supplies in this Basin as their activity increases. Water supplies developed to meet the needs of the Basin will of necessity come from the larger watersheds now occupied by towns and industries. On some of these watersheds pollution control measures will be necessary before the water may be successfully used for domestic purposes.

At present chlorination is the sole treatment relied upon for protection of consumers using municipal surface supplies. Chlorine used in this area is shipped from California, and any interruptions in this supply of chlorine could seriously affect the safety of the water supplied to a large percentage of the population in the Basin. Such a shortage would affect the three largest metropolitan areas in the Basin, namely, Salt Lake City, Provo, and Ogden, Utah.

The accompanying table shows that most of the industries located in or adjacent to municipalities with public water supplies use these supplies for their domestic water needs while their process water is obtained largely from wells, with some supplemental water being furnished by irrigation canals.

As industry expands to meet local and national demands for its products, it will be forced to seek new water supplies. Some of these demands may be met by further utilization of the ground water resources. Those heavy industries that must depend to a large degree on surface water storage and runoff may be somewhat limited in their expansion because of the time necessary for the development of storage and reclamation projects. At present, all normal flows from the streams in the Utah portion of the Basin have been appropriated. Additional water can only be secured through projects which will impound flood flows or bring unappropriated water from outside the area into the Basin.

Projects planned by the Bureau of Reclamation to secure additional water for the Great Basin area would utilize both of these procedures. The Central Utah Project will make water from the Colorado River, allocated to Utah by the Upper Colorado River Compact, available in the Great Basin area while the Weber River Project will store flood waters which are now lost. Oil and metal refining industries would benefit from the development of additional surface water supplies. Since these industries are a vital part of our defense preparedness program it is important that plans for and the development of additional water supplies proceed as quickly as possible so that the industries of the Basin may be expanded to meet demands placed upon them by the present preparedness program.

Although the Great Salt Lake Basin has several million acres of fertile soil and a fine climate for agriculture, the seasonal rainfall does not provide enough moisture during the growing season to sustain most crops. Because of this, irrigation has become an important part of the agricultural development of the area. Currently approximately 750,000 acres are under irrigation and projects under consideration would provide irrigation water for approximately 90,000 acres of new land.

In July 1847, the first settlers of the Latter Day Saints Church diverted water from one of the creeks at the present site of Salt Lake City, and founded the practice of irrigation in the Utah area. Since then the practice has become widespread throughout the agricultural areas of the Basin. Important irrigation projects of the Basin include the projects on the Weber River and Provo River, and proposed developments on the Bear River and the Colorado River.

The Weber River project was first considered in 1922 by the Reclamation Service in cooperation with the Utah State Water Storage Commission. In 1924 the site for Echo Dam was chosen; the appropriation for construction was approved by Congress on December 5, 1924.

INDUSTRIAL WATER SUPPLIES FOR
GREAT SALT LAKE BASIN

<u>Name of Industry</u>	<u>Town</u>	<u>State</u>	<u>Source</u>
Perry Canning Co.	Perry	Utah	City, wells
Golden Gem Potatoe Chip Co.	No. Ogden	"	City
North Ogden Canning Co.	" "	"	City, well
Smith Canning Co.	Clearfield	"	" "
Woods Cross Canning Co.	"	"	" "
Kaysville Canning Co.	Syracuse	"	" "
Layton Sugar Factory	Layton	"	Canal, well
Kaysville Canning Co.	Kaysville	"	Wells
Smoot Dairy	Centerville	"	"
Bountiful Dairy	Bountiful	"	City, well
Moss Dairy	Woods Cross	"	Wells
Holbrook Dairy	" "	"	"
Wasatch Oil Refinery	" "	"	"
Western States Refinery	No. Salt Lake	"	City
Cudahy Packing Co.	" " "	"	Wells
Standard Oil of Calif.	" " "	"	City
U.P.R.R. Shops	Salt Lake City	"	"
Utah Oil Refining Co.	" " "	"	City, wells
Saltair Salt Plant	" " "	"	" "
Magna Mill	Magna	"	Canal, wells
Arthur Mill	Garfield	"	" "
Kennicott Copper Co.	"	"	" "
American Smelt. & Refining Co.	"	"	Wells, surface
Fellers Meat Packing Co.	Tooele	"	City
Intermountain Smelting Co.	"	"	Wells, surface
Combined Metals Reduction Co.	Stockton	"	Mine, Tooele City
Bonneville Limited	Wendover	"	Wells, W.P.R.R.
Cache Valley Dairy Assn.	Amalga	"	City, wells, stream
California Packing Co.	Smithfield	"	City, wells
Amalgamated Sugar Co.	Lewiston	"	City, springs, stream
Sego Milk Co.	Richmond	"	City, spring
E. A. Miller Packing Co.	Hyrum	"	City
J. L. Miller Packing Co.	"	"	Spring
Sego Milk Products Co.	"	"	City
Morning Milk Co.	Wellsville	"	City, spring
Utah By-Products Co.	Garland	"	City
U. & I. Sugar Co.	"	"	City, canal
Allen Meat Co.	Tremonton	"	Spring
Harper Meat Co.	Brigham City	"	Well
Box Elder Packing Co.	" "	"	City, well
Baron Woolen Mills	" "	"	City

<u>Name of Industry</u>	<u>Town</u>	<u>State</u>	<u>Source</u>
Brooklawn Creamery Co.	Oakley	Utah	Surface
U.P.R.R. Shops	Echo	"	Springs
Ideal Cement Co.	Devils Slide	"	Wells
Morgan Canning Center	Morgan	"	City, spring
California Packing Co.	"	"	" "
South Ogden Canning Co.	So. Ogden	"	Well
Parke & Sons Packing Co.	Ogden	"	City
Armour Creamery	"	"	"
Ogden Union Stock Yards	"	"	"
Utah Ice Plant	"	"	City, river, well
U.P.R.R. Shops	"	"	City, stream
Utah Canning Co.	"	"	City, well
Swift & Co.	"	"	City, river
California Packing Co.	"	"	City, canal
Ogden Dressed Meats Co.	"	"	City, well
Utah By-Products Co.	"	"	" "
Quaker Oats Co.	"	"	" "
Solar Corp.	"	"	City
Ogden Union R.R.	"	"	City, surface
S.P.R.R. Shops	"	"	" "
Custom Slaughterhouse	Riverton	"	Wells
Draper Egg Products Co.	Draper	"	Draper Irr. Co.
A. Bills & Co.	Midvale	"	City
Hunt Foods	Murray	"	City, well
Jordan Valley Canning Center	"	"	" "
Winder Dairy	So. Salt Lake	"	Wells
Joe Doctorman & Co.	" " "	"	"
Jordan Meat & Livestock	" " "	"	"
U & I Sugar Co.	West Jordan	"	City, canal
Hogan Dairy	" "	"	City, well
Murray Laundry	Murray	"	Well
Roschill Dairy	"	"	"
Granite Meat & Livestock	"	"	"
Murray Meat & Livestock	"	"	"
Granite Sch. Dist. Canning Center	So. Salt Lake	"	"
Archie McFarland & Sons	" " "	"	"
Joe Doctorman & Sons	" " "	"	"
Pleasant Grove Canning Co.	Orem	"	City, well
Geneva Steel Co.	"	"	Wells, canal
Pleasant Grove Canning Co.	Pleasant Grove	"	City, well
Lehi Roller Mills	Lehi	"	Well
Herbert Winn's Slaughterhouse	Nephi	"	City
Juab County Mill & Elev. Co.	"	"	"
Dixon Slaughterhouse	Payson	"	"
Illinois Powder Co.	Spanish Fork	"	Wells

<u>Name of Industry</u>	<u>Town</u>	<u>State</u>	<u>Source</u>
Rendall James Slaughterhouse	Spanish Fork	Utah	Wells
California Packing Co.	" "	"	"
Neil Thomas Slaughterhouse	" "	"	"
Jox Slaughterhouse	" "	"	"
Utah Hide & Tallow Co.	" "	"	"
Eddington Cannery	Springville	"	City, spring, well
Utah Growers Coop.	"	"	City, well
Ironton Plant	Provo	"	City, canal, wells
Utah County Packing Co.	"	"	City, wells
Republic Creosote Co.	"	"	City
Pacific States C.I.P. Co.	"	"	"
John Kuhni & Sons By-Products	"	"	Well, canal
Utah By-Products Co.	Heber	"	City
Wasatch Meat Co.	"	"	"
Heber Mercantile Slaughterhouse	"	"	"
Cascade Fish Co.	Charleston	"	Spring
Sharon Industries	Provo	"	City
Arden Dairy	American Fork	"	Well
Utah Growers Coop.	" "	"	City
Utah Poultry Co.	" "	"	"
Utah Wool Pulling Co.	Salt Lake City	"	Well
Linde Air Products	" " "	"	City
Kraft Cheese Factory	Grace	Idaho	Wells
Thatcher Cheese Factory	Thatcher	"	Springs
Paris Cheese Factory	Paris	"	City
California Packing Co.	Franklin	"	Wells, stream
Franklin County Sugar Co.	Whitney	"	Wells, springs

The reservoir behind Echo Dam stores 73,900 acre-feet of water which supplies supplemental irrigation water for approximately 90,000 acres of land west of the Wasatch Range between Salt Lake City and Ogden.

Since the completion of the first Weber River Project it has become necessary to enlarge the storage capacity so that more land might be brought under irrigation and some domestic water made available.

This new project, known as the Weber Basin Project, plans to increase the useful water supply of the area at canal heads by an average total of 238,000 acre-feet annually and furnish 5,400 acre-feet of stored water to the Provo River for use on lands in Utah County. Of this supply, 198,000 acre-feet would be utilized for irrigation and 40,000 acre-feet would be used for domestic purposes in communities in Davis and Weber Counties. The irrigation water would provide a full-season supply for 50,600 acres of potentially productive lands now unirrigated, and approximately 27,000 acres now only partially productive because of irrigation water shortages.

An important storage feature of the Weber Basin Project is Willard Bay Reservoir to be formed by separating Willard Bay from Great Salt Lake by a dike. This reservoir will have a maximum capacity of 215,000 acre-feet and cover approximately 11,000 acres. The stored water will be pumped back through the Willard Bay pump canal and used to irrigate lands lying west of Ogden. It is further proposed to develop this reservoir for recreational use.

The Provo River project came about as the result of drouth years between 1931 and 1935 when the storage in Utah Lake, which supplied irrigation water for the area, fell from 850,000 acre-feet to 20,000 acre-feet. The construction of Deer Creek Dam was authorized on November 16, 1935. In conjunction with construction of this dam the Weber-Provo Diversion Canal was enlarged and a six mile tunnel driven to the Duchesne watershed to provide supplemental water for storage in Deer Creek reservoir.

The Deer Creek Dam and Reservoir provides 152,600 acre-feet of storage. The reservoir stores Provo River flood waters, surplus waters of the Weber River diverted by the enlarged Weber-Provo Diversion Canal, and surplus water from the headwaters of the Duchesne River diverted by the six-mile tunnel. The Deer Creek Division of the project is to furnish a supplemental water supply for the irrigation of approximately 46,000 acres in Utah and Salt Lake Valleys.

The Salt Lake Aqueduct Division provides an aqueduct from Deer Creek Dam to Salt Lake City for a supplemental water supply for the city and approximately 10,000 acres of suburban lands.

The Utah Lake Division is to furnish a supplemental water supply for about 40,000 acres in the Jordan River portion of the Salt Lake Valley. Features of this Division include the proposed

Utah Lake Goshen Bay dike, about five and one-half miles in length, and the Jordan River channel revision.

The Strawberry Valley project which was completed in 1922 was distinctive in two respects. It was the first large-scale diversion of water from the Colorado River drainage basin into the Great Basin, thus fulfilling a need for a "new" water supply in the Utah Valley. The project was also one of the first in Bureau of Reclamation history to develop hydroelectric energy. Water from the 283,000 acre-foot reservoir behind Strawberry Dam is diverted into the Great Salt Lake Basin through Strawberry Tunnel, to irrigate approximately 42,000 acres of land in the Strawberry Valley and adjacent to Utah Lake in the vicinity of Spanish Fork.

The Ogden River project with Pineview Dam has a storage capacity of 44,175 acre-feet. This project furnishes a partial supply of irrigation water for 14,700 acres and a full supply for 6,000 acres.

All of the aforementioned projects are being amortized by private water associations.

The State population has grown to the extent that the State must expand its agricultural activities to meet the increased demands. This means that more water must be made available for irrigation. The problem has been attacked at State and Federal levels. At present, the State has approximately 40 projects under consideration involving a water storage capacity of approximately 26,571 acre-feet for furnishing supplemental irrigation water to about 71,000 acres and for opening approximately 600 acres of additional land to irrigation. The Federal Government, through the Bureau of Reclamation, has three projects under consideration that would furnish supplemental irrigation water for about 93,100 acres and open approximately 89,600 additional acres of land to irrigation. These three projects would have a storage capacity of approximately 500,000 acre-feet.

The projects are the Weber Basin Project, Bear River Project and Central Utah Project. The Weber Basin Project has been discussed in a previous paragraph in connection with the original Weber River Project.

The Bear River Project has as its object the development of a plan for the fullest practicable control and use of the Bear River water for a number of purposes including irrigation, power, flood control, recreation, and fish and wildlife propagation. Although Bear River at present is extensively developed for irrigation, power, and other uses, greater and more efficient use of its water could be accomplished through additional storage control and by altering or decreasing downstream uses of water for power. Potential storage features of the project include Glendale Reservoir enlargement, Gentile and Sage Valley Reservoirs, and the Cutler Reservoir enlargement.

The Central Utah Project is designed for multiple purpose use in Utah of water tributary to the Colorado River. The project would intercept streams draining the southern slope of the Uinta Mountains in the Uinta Basin and convey the water by gravity flow through the Wasatch Mountains to the Bonneville Basin. The water would be collected by an aqueduct leading to a storage reservoir high in the Wasatch Mountains. From the reservoir the water would drop through a series of hydroelectric power plants before being used for irrigation, municipal, and industrial purposes. Replacement water and water for additional development in the Uinta Basin would be provided by a major diversion from the Green River and by smaller developments on local streams.

It is believed that the completion of these 43 projects of the State and Federal governments would satisfy the Basin's irrigation needs for many years.

The fishery resources of the Basin are extensively used by sportsmen. Fishing pressure requires a large hatchery program for maintaining the fish population in numerous mountain streams, reservoirs and lakes. Funds spent on the hatcheries during the biennium July 1, 1946 - June 30, 1948, amounted to about \$180,000. Different species of trout thrive in the cold mountain waters, particularly in the headwaters of the Weber, Bear and Logan Rivers situated on the eastern side of the Basin.

In the western portion of the area there are relatively few streams. However, rainbow and the native cutthroat trout are common in a few, small streams such as Grouse Creek in Utah and Thousand Spring Creek, Nelson Creek, Cherry Creek, and Bassett Lake in Nevada.

The principal lakes used by sport fishermen are Bear Lake and Utah Lake. Here, yellow perch, channel catfish, black bullhead and carp are listed by M. J. Madsen as common or abundant. Rough fish are encountered in the lower stream levels near the river mouths and in some instances are sold commercially.

Another important use of the water resources in this area is to maintain the waterfowl population in the migratory bird refuges. This population is of such importance to the nation as well as to the State that special supplies of water have been earmarked for its preservation and growth. New feeding and nesting areas have been developed. On Ogden Bay, vast alkaline flats have been irrigated, water impoundments developed, and a highly successful Refuge developed from barren areas of waste. Similarly, marked habitat improvements are in progress at Farmington Bay which also borders Great Salt Lake. These refuges together with the Bear River Migratory Waterfowl Refuge, situated nearby, lie on the Pacific flyway.

The extensive mountain areas in the Great Salt Lake Basin afford recreation centers for most of Utah's population. The facilities provided are in most instances intimately related to the

quality and quantity of water. Sport fishing is a major recreational activity and big game hunting is also a popular sport. Hunters from other states come long distances, attracted by the world famous bird populations, and by the big game animals such as deer and elk.

Great Salt Lake has three bathing beaches and a county boat harbor, and is used extensively for boating and swimming. Bear Lake and Utah Lake are used for fishing, boating, and picnicking. Reservoirs are used for various recreational activities. Appropriately, there are certain use restrictions but still such large water bodies serve a valuable purpose.

At present hydroelectric power generation is an important use of the water in this Basin. There are approximately 26 privately owned hydroelectric plants in the area with a rated capacity of 176,000 kilowatts. In addition to these privately owned plants, there are 13 municipally operated power stations.

POLLUTION CONTRIBUTED TO WATER RESOURCES

Fifty-four municipalities have been considered in this Basin report. Seventeen of these communities are located around Great Salt Lake, primarily on its eastern side, and discharge their wastes directly to the lake or lake area and so do not pass through a substantial watercourse. Wastes from these communities have an estimated population equivalent, reaching the lake vicinity, of 342,065 persons or approximately 55 percent of the pollution discharged by all the municipalities of the Basin. Of the seventeen sources that discharge to the lake, five have no treatment with a population equivalent of 326,800, five have minor treatment consisting of septic tanks, which are in general poorly maintained, discharging a population equivalent of 7,170 and six have primary treatment, either Imhoff tanks or clarifiers, discharging a population equivalent of 8,095. The remaining community has secondary treatment with sub-surface disposal and does not contribute pollution to the lake.

The area bordering Great Salt Lake is uninhabited except for a small area along the southern shore that is used for recreation. This area includes Sunset Beach, Black Rock Beach, Salt Lake County Boat Harbor and Saltair Beach. Some of the domestic wastes discharged to the lake are discharged in close proximity to these recreational areas. However, the effect of the wastes on the water quality is undetermined at the present time.

Bear River and its tributaries receive a pollution population equivalent of 53,825 persons from 15 municipal sources. The river empties into the Bear River Migratory Waterfowl Refuge which is located on Great Salt Lake at the mouth of the river. Only seven sources of pollution actually discharge to Bear River proper, and these constitute about ten percent of the total pollution load. The Cub River receives about nine percent of the load from two sources before discharging into the Bear River. Little Bear River proper receives only about one percent from a single source. However, Logan River adds another 41 percent, contributed by the city of Logan, Utah, so that Little Bear River contributes approximately 42 percent of the total pollution load reaching Bear River. Malad River, furthest downstream tributary of the Bear River, has four sources of pollution that make up the remaining 39 percent of the total population equivalent of 53,825 received by the Bear River drainage system from municipal sources.

It should be noted that potential interstate water pollution problems exist on the Bear River and its tributaries, but at no other point in the Basin. Treated sewage from Evanston, Wyoming, enters the main stem of the stream just prior to its entry into Utah. Sewage and industrial wastes from the Preston-Franklin area in Idaho enters a tributary to Bear River (Cub River) before it crosses the state line into Utah, and pollution from the Malad, Idaho area enters the Malad

River near the state line. The extent of damage occasioned by these sources has not been determined.

Of the 15 municipal sources of pollution on the Bear River, four places provide primary treatment, three provide minor treatment, and the remaining eight discharge untreated wastes to the water-course. The municipal sewerage systems of Tremonton and Logan are the two major pollution sources. Pollution from Tremonton is large because of the industries connected to its sewer system.

The Weber River system receives municipal pollution from six sources representing an approximate population equivalent of 173,000 persons or about 27 percent of the entire pollution load for the Basin. The major source of pollution in this river system is Ogden, Utah, which contributes approximately 98 percent of the entire load in the Weber River. Ogden's sewage is untreated and discharges into Weber River west of Ogden and below the junction of the Ogden and Weber Rivers. The domestic sewage is relatively dilute and the large volume would increase cost of treatment works. The wastes from the industries that are connected to the Ogden sewer system represent about 67 percent of the population equivalent of the wastes discharged to the Weber River. The water of the Weber River is used for irrigation below the Ogden sewer outlet and eventually flows through the Ogden Bay Bird Refuge. Of the five remaining municipal sources of pollution in the Weber River drainage area, four have some type of treatment.

Brigham City's sewage empties into Box Elder Creek after septic tank treatment. Brigham City is the only source of pollution discharging wastes to this small stream. The wastes have a population equivalent of 3,400 persons. The water in Box Elder Creek below Brigham City passes through the Bear River Migratory Waterfowl Refuge before entering Great Salt Lake. There is a local nuisance below the Brigham City outfall during periods of low flow. The stream in this area is known as "Black Slough" by the local inhabitants, which gives an indication of the stream condition during low flow.

Jordan River and its tributaries receive domestic sewage pollution from six sources having a combined population equivalent of 10,580 persons. This is approximately 1.7 percent of the municipal pollution in the Basin. Four of the sources discharge directly to Jordan River and the remaining two discharge to Bingham Creek. The four municipalities discharging to the main stream have some type of treatment while the two that discharge to Bingham Creek have no treatment. The treatment provided is generally considered inadequate.

The municipal pollution entering Utah Lake is transported via the numerous streams and drainage channels to the lake proper. It is difficult to determine the amount of pollution actually entering the lake, as most of the municipal sources are located some distance from the lake shores and the water is used to some extent for irrigation between the pollution sources and the lake.

TABLE A
SOURCES OF POLLUTION
MUNICIPAL

Municipalities*	Sources of Pollution (In Number of Municipalities*)	Population Served by Sewerage System	Amt. of Pollution Discharged to Water- course (In Terms of Equivalent No. of People)**
Having data on pollution load discharged to watercourse	54	381,130	633,140
Having popula- tion data avail- able (Data on pollution load to watercourse incomplete or not available)			Undetermined
TOTAL	54	381,130	xxxxxx

*Includes incorporated or unincorporated municipalities; other legal bodies as sanitary districts, counties, towns; significant institutions, resorts, recreational centers or other population centers.

**Includes industrial wastes discharged into municipal sewerage systems.

TABLE B
SOURCES OF POLLUTION
INDUSTRIAL*

Industries*	Sources of Pollution (In Number of Plants)	Amount of Pollution Discharged to Watercourse (In Terms of Equivalent Number of People)
Producing Organic Wastes	82**	1,178,650
Producing Organic Wastes	10	Undetermined
Producing Inorganic Wastes	5	Not Applicable
Producing Wastes of Undetermined Type	18	Undetermined
TOTAL	114***	xxxxxx

*Industries having separate outlets discharging wastes directly to water-course.

**Includes one plant also producing inorganic wastes.

***Total adjusted to correct for duplication noted in footnote marked thus, **.

TABLE C
EXISTING TREATMENT FACILITIES
MUNICIPAL

Degree of Treatment Provided	Number of Municipalities* Served	Number of Treatment Plants	Population Served
Primary	14	14	25,487
Secondary	2	2	1,150
No Treatment	38**		
Totals		16	26,637

*Includes incorporated or unincorporated municipalities; other legal bodies as sanitary districts, counties, towns; significant institutions, resorts, recreational centers or other population centers.

**Includes 17 communities with septic tanks that the various health departments believe are of little value.

TABLE D
EXISTING TREATMENT FACILITIES
INDUSTRIAL*

Type Industry	Number of Plants	Number of Industrial Plants Having:		
		Treatment Facilities	No Treatment Facilities	Undetermined Facilities
Manufacturing				
Food	84	39	42	3
Textile	1		1	
Lumber	0			
Paper	0			
Chemical	1			1
Petroleum	5	5		
Rubber	0			
Leather	0			
Metal	1	1		
Metal (Fab.)	1	1		
Misc.	13	3	9	1
Non-Manufacturing				
Oil	0			
Mine (Drain.)	2**	1**	1**	
Mine (Other)	8	6	2	
TOTAL	114***	55***	54***	5

*Industries having separate outlets discharging wastes directly to watercourse.

**Also included under Mine (Other).

***Total adjusted to correct for duplication noted in footnote marked thus, **.

There are six communities that discharge wastes directly to watercourses that flow into Utah Lake and one that discharges its wastes into Provo River above Deer Creek Reservoir. These seven communities represent about eight percent of the Basin's municipal pollution. Three communities have some type of treatment, one is constructing treatment facilities, and three have no treatment. The three existing treatment plants are not considered satisfactory.

Nephi, Utah, and Montello, Nevada, the remaining sewered communities in the Basin, provide secondary treatment and minor treatment, respectively, for their wastes. The treatment at Nephi is considered to be adequate. The effluent is widely used for irrigation with the excess going to Mona Reservoir for storage.

One hundred and fourteen industries have been considered in this report. Twenty-seven of these industries are located in the vicinity of Great Salt Lake and dispose of their wastes directly to the lake or to small streams or ditches that drain to the lake or its surrounding marshes. Many of these streams and ditches provide irrigation water after receiving industrial wastes and it is therefore difficult to determine what percentage of the wastes actually reach the lake. Many have seasonal operations that generally reach a peak in the fall months. The estimated maximum population equivalent produced by 14 of these industries is 142,700 persons. The population equivalent of 13 of the industries is undetermined. Approximately two-thirds of the industries produce organic wastes and one-third produce wastes of an undetermined nature.

There are 16 industries located in the Bear River drainage area. Five of these industries discharge wastes directly to Bear River, four to Cub River, four to Little Bear River and three to Malad River. The wastes produced by the 16 industries in this area have an estimated population equivalent of 685,580 at the seasonal peak. All of these industries process the products of farming and ranching. Seven of the plants have some waste treatment facilities. Three beet sugar factories and one large vegetable canning plant account for about 95 percent of the population equivalent produced in this area by industry. Fish kills frequently occur in the Bear River during the sugar beet season because of oxygen deficiencies or presence of floating sugar beet pulp.

In the Brigham City area, three industries discharge wastes that drain into Box Elder Creek. Only one plant has any waste treatment. These three industries contribute a population equivalent of approximately 15,340 persons. Two of these plants are concerned with food production and the third is engaged in textile manufacture. All of the wastes are organic in nature.

The Weber River drainage system receives the wastes from 21 industries. A population equivalent of approximately 108,000 persons was estimated for wastes from 12 of the 21 plants. The population

equivalent for the wastes from nine plants was undetermined. The largest contributors of wastes are the vegetable and meat processing industries located in the vicinity of Ogden, Utah. One cement plant, located at Devils Slide near the junction of Lost Creek with Weber River, at times contributes heavily to the existing silt load of the stream and thereby increases the hazard to aquatic life. However, the entire effects of the wastes of this industry are undetermined at the present time.

Nine of these 21 industries located in the Weber River drainage area have some type of treatment. These nine include most of the large plants in the Ogden area. However, in most cases the treatment is very inadequate. Thirteen plants in this area are engaged in some phase of food processing, and produce organic wastes. Two plants produce inorganic wastes and the type waste produced by the remaining six industries is undetermined.

The area drained by Jordan River and its tributaries has 17 industries. These industries produce wastes with a population equivalent of about 114,800 persons. All of these industrial wastes are considered organic. The main source of pollution in this area is a sugar beet processing plant that discharges wastes having an estimated population equivalent of approximately 93,000 persons, or 81 percent of the wastes produced in this drainage area. Seven of the 17 industries provide some type of treatment for their wastes.

The Surplus Canal, a flood control channel that empties into Great Salt Lake, is roughly parallel to Jordan River. Two small industries that produce wastes of an undetermined character discharge wastes into this canal.

There are 26 industries located in the area that drains into Utah Lake. Four of the 26 plants are located on Provo River above Deer Creek Reservoir. All of these plants provide satisfactory treatment for their wastes and as far as is presently known do not impair the quality of the waters that are stored in the reservoir.

Four of the plants are located on the shores of the lake and discharge wastes directly to the lake. These four industries include the two largest waste producers in this area. These two large plants provide treatment for their wastes.

The remaining 18 industries in the Utah Lake drainage area discharge their wastes to streams or drainage channels in the area. The flow in these streams and channels is diverted in many cases for use as irrigation water after receiving the industrial wastes.

The population equivalent of the wastes from 18 of the 26 industries in the Utah Lake drainage area is estimated at 111,100 persons. The majority of these 18 plants are engaged in some phase of food processing. The population equivalent of the wastes from the remaining eight industries is undetermined.

There are two food processing plants, with a combined estimated population equivalent of 560 persons, that discharge their wastes into the Mona Lake drainage area. Neither of these plants provides treatment for its wastes. These untreated wastes are dumped into irrigation ditches that eventually discharge into the lake.

The economic development of this Basin has resulted in significant reductions in and disturbances of the natural vegetative cover. Throughout the mountainous sections, man-made changes in the pristine cover conditions, brought about by improper agricultural development, have greatly accentuated natural processes of land erosion.

Adequate watershed protection has become a serious economic problem. Most of the water originates in the high mountains from melting snow. Over-grazing destroys valuable soil cover needed to reduce the extent of and damage from the spring floods that are highly destructive. Most critically eroded, flood-producing areas are along the steep face of the Wasatch Front. Here, the damage from mud and rock flows during the past 20 years has been estimated at \$788,000.

In certain parts of the Basin, stream sedimentation interferes with the operation of irrigation diversions and is considered hazardous to the aquatic populations of the watershed streams. Steps are being taken toward more effective soil erosion protection and control of the characteristically erratic runoff.

TABLE E
ADEQUACY OF EXISTING TREATMENT FACILITIES

MUNICIPAL*

Number of Municipal* Treatment Facilities	Adequacy With Relation To:					
	Capacity			Operation		
	Satisf.	Unsatisf.	Unde- termined	Satisf.	Unsatisf.	Unde- termined
16	7	4	5	5	5	6

*Includes incorporated or unincorporated municipalities; other legal bodies as sanitary districts, counties, towns; significant institutions, resorts, recreational centers or other population centers.

TABLE F
ADEQUACY OF EXISTING TREATMENT FACILITIES

INDUSTRIAL*

Number of Industrial* Treatment Facilities	Adequacy with Relation To:					
	Capacity			Operation		
	Satisf.	Unsatisf.	Unde- termined	Satisf.	Unsatisf.	Unde- termined
55	8	4	43	9	3	43

*Industries having separate outlets discharging wastes directly to water-course.

TABLE G
PROGRESS IN CONSTRUCTION OF POLLUTION ABATEMENT FACILITIES

Year	Municipal		Industrial	
	Sewage Treatment Plans Completed	Design Population	Waste Treatment Plants Completed	Amount of Waste Treated (In terms of Equiv. No. People)
1946				
1947				
1948			3	15,000
1949	1	4,000	2	4,500
1950	2	10,100	1	49,000
Total	3	14,100	6	68,500

TABLE H
WASTE TREATMENT NEEDS - MUNICIPAL*

Needs	Number	Population Served by Facilities
New Plant	20	325,330
Enlargement or Additions, to Existing Plant	8***	13,087
Replace Existing Plant	18**	28,463
No Project Required	5	9,250
Undetermined	3	5,000

*Includes incorporated or unincorporated municipalities; other legal bodies as sanitary districts, counties, towns; significant institutions, resorts, recreational centers or other population centers.

**17 of these are septic tanks that were reported as having no treatment in Table C. One plant shown in Table E under "Capacity Satisfactory" was considered to need enlargement in the very near future by the State pollution control agency.

***Two plants shown on Table E under "Adequacy with Relation to Capacity-Undetermined" were considered to need replacement or an addition by the State pollution control agency.

TABLE I
INDUSTRIAL* WASTE POLLUTION ABATEMENT NEEDS

Needs	Number
New Treatment Plant or other Pollution Control Measures	37
Enlargement or additions to Existing Plant	5
Replace Existing Plant	0
Connection to Municipal Sewer System	0
No Project Required	8
Undetermined	64

*Industries having separate outlets discharging wastes directly to watercourse.

DAMAGES TO WATER RESOURCES FROM POLLUTION

Generally speaking, the scarcity of water has resulted in great value being placed upon water without equal regard for its quality.

Domestic sewage, fortunately, in most cases reaches water-courses below intakes for public water supplies though there are a few supplies not so well situated. Extensive recreational development of the watershed area that supplies water to Salt Lake City has raised the question of whether complete treatment of the public water supply is indicated rather than chlorination only, as currently provided.

The greatest potential pollution damage in the Basin is to waters used for irrigation. Many low growing vegetables, notably lettuce, cabbage and celery, are raised in portions of the Basin where irrigation waters may contain sewage. For example, water is diverted from the Weber River below the Ogden sewer outfall during the late summer to augment other irrigation supplies, although at times during this period the stream flow is mostly sewage and complete oxygen depletion is not uncommon. The occurrence of a single epidemic of enteric disease traceable to food crops irrigated with sewage-polluted water could do almost irreparable damage to this agricultural industry.

One rather obvious instance of damage to surface waters can be observed in Provo Bay of Utah Lake. Here industrial and domestic wastes have combined to blight a large area.

In the Bear River Migratory Bird Refuge and the Farmington and Ogden Bay Refuges the incidence of disease is believed to be increased seriously by polluted water entering the refuges. Mortalities of upward to 10,000 birds per year have occurred. Wastes from a cement plant creating high turbidity enter Lost Creek, tributary to the Weber River, and degrade that habitat for fish. In general, siltation due to loss of soil cover is a widespread cause of pollution in the Basin. Many valuable trout streams such as Provo River and Chalk Creek are being degraded by silt.

Toxic materials have leached from mine and mill tailings and endangered livestock in certain portions of the Basin. Alkali salts leached from the soil by natural and irrigation runoff have degraded the lower reaches of some of the streams.

BENEFITS RESULTING FROM POLLUTION PREVENTION AND ABATEMENT

Because pollution abatement activities have not kept pace with municipal and industrial growth, the actual tangible benefits of accomplished pollution abatement in this Basin are primarily of a potential nature. The greatest single Basin-wide benefit which may result from pollution abatement is the elimination of the hazard attendant upon widespread use of sewage polluted irrigation water. The proper treatment and reclamation of domestic and industrial wastes is of great economic significance in this Basin because of its limited water resources.

Other potential benefits are somewhat more localized. Pollution abatement above Stoddard on the Weber River would decrease the public health hazards of using the supply to be developed by the Bureau of Reclamation's Weber Basin Project. Industrial and municipal waste treatment could return a large area of Utah Lake to beneficial use and at the same time remove a serious local nuisance. The proper handling of mining, milling and dredging wastes could reduce siltation and toxic poisoning which have caused stream degradation and fish kills. The removal of organic oxygen-depleting materials would tend to eliminate the conditions conducive to botulism which kills thousands of wildfowl each year in the Great Salt Lake area.

Benefits resulting from control of water pollution are most directly associated with the respective water uses, though there are also indirect but very significant benefits that accrue as, for example, the increase in real estate and property values following control of water pollution.

Examples of benefits that may accrue in the case of public water supplies are reduction in bacteriological contamination and reduction in taste and odor producing substances by control of domestic and industrial waste pollution. Such control lessens the potential disease hazard and permits the delivery of drinking water of satisfactory physical, chemical, and bacteriological quality at a reduced cost for water treatment. In certain instances waste treatment measures spell the difference between feasibility of utilizing a given watercourse for domestic use water supply and the necessity of utilizing an alternative source at a greater distance and, therefore, at a greater cost for development.

The quality required for process water by industry varies according to the products involved. It varies from minimum or no water quality requirements to those that can be met in some cases only by carefully controlled distillation of the raw supply. Generally, where industry uses a watercourse both as a source of supply and as an outlet for its wastes, control of industrial pollution through treatment of waste benefits downstream industry by reducing water-treatment costs. In achieving pollution abatement, utilization and

re-use of by-products formerly wasted may be accomplished to the economic advantage of the industry.

Aquatic life is benefited by pollution control and such control may mean the difference between a profitable and a non-profitable fishery. Similarly, benefits can be shown to accrue from water pollution control for recreation, irrigation and other water uses.

TABLE J
CURRENT STATUS OF MUNICIPAL* ACTION ON
POLLUTION ABATEMENT NEEDS

Status of Action	Number of Municipalities*
Inactive	43
Active Planning	4
Final Plans Approved	1
Under Construction	1

*Includes incorporated or unincorporated municipalities; other legal bodies as sanitary districts, counties, towns; significant institutions, resorts, recreational centers or other population centers.

TABLE K
CURRENT STATUS OF INDUSTRIAL* ACTION ON
POLLUTION ABATEMENT NEEDS

Status of Action	Number of Industries*
Inactive	105
Active Planning	1
Final Plans Approved	
Under Construction	
Undetermined	

*Industries having separate outlets discharging wastes directly to watercourse.

POLLUTION PREVENTION MEASURES IN EFFECT

Very little has been accomplished in the Great Salt Lake Basin in providing new treatment facilities for the abatement of water pollution. In the last five years three municipal plants, serving 14,100 persons, and six industrial plants, handling wastes with a population equivalent of 68,500 persons, have been constructed. With these few exceptions, all of the existing treatment facilities are quite old.

Table C indicates that 16 of the 54 sewer communities provide treatment for their wastes. However, 17 of the remaining 38 communities have septic tanks that give some small measure of treatment. Of the 16 communities that are considered to provide treatment, two serving a population of 1,150 persons, provide secondary treatment and 14, serving a population of 25,487 persons, provide primary treatment. The 17 communities that have septic tanks, however inadequate they may be, serve a combined population of 28,163 persons. This leaves 21 communities serving 326,300 persons or about 36 percent of the sewer population without waste treatment facilities of any kind.

Table D shows that 55 of the 114 industries in the Basin provide some type of treatment for their wastes. Of the remaining 59 industries, 54 have no treatment facilities and the facilities of the remaining five have not been determined at the present time.

Of the 55 industries that provide treatment, ten have intermediate treatment and 45 have minor treatment. This indicates a great need for pollution control work throughout the Great Salt Lake Basin.

There has been no recent comprehensive water pollution control legislation enacted in the State of Utah. However, there is new legislation under consideration at the present time for presentation to the Legislature at its next session. Present legislation affecting water pollution control is scattered through the statutes. Authority for control of various aspects is shared by the Governor, State Department of Health, State Engineer, Fish and Game Commission, and local, municipal, and county authorities. Interestingly, for purposes of the Federal "Water Pollution Control Act" (Public Law 845), the State Department of Health was designated as the "State water pollution agency", by the Surgeon General of the Public Health Service with the concurrence of the Governor of Utah.

The Governor, through the Attorney General, can bring action to abate pollution of waters, used for domestic purposes, caused by maintaining domestic animals, (corrals, manure, sheep dipping, dead carcasses, etc.). The State Department of Health, to protect drinking and culinary waters, may regulate industrial and other camps, summer

resorts, privies, cesspools, pig pens and hog yards. It supervises sanitation of public swimming and bathing places and derives further supervision and control from its general powers to protect the public health. The State Engineer's authority involves approval for diversion of appropriated waters. For such approval, it must be shown that when returned to streams or lakes the original water will not be deteriorated in quality. The Fish and Game Commission enforces provisions relating to pollution injurious to fish by sawmills, reduction works, smelters, etc., and also provisions relating to pollution of waters, used for culinary purposes, caused by fishermen, campers, hunters or other persons. To protect municipal water supplies from pollution, city councils have authority to enact ordinances and regulations to prevent pollution or contamination of streams or watercourses which furnish these supplies. Local boards of health are "responsible for protecting and promoting the people's health".

The Utah State Department of Health, through its Division of Sanitary Engineering, has sponsored the proposed comprehensive water pollution control legislation that is to be presented to the Utah Legislature. The Division of Sanitary Engineering has also made a survey of the industrial and municipal pollution sources in the Utah section of the Basin as well as establishing a stream sampling program. This Division also arranged for the laboratory facilities that are being used in the stream investigations.

Even though there are no current comprehensive laws covering water pollution prevention and abatement in the State of Utah, progress is being made. Several of the communities and industries have undertaken cooperative waste disposal studies in conjunction with the Division of Sanitary Engineering of the Utah State Department of Health. The best example of these is the joint study with the Geneva Steel Company. In an effort to reduce the wastes that the plant has been discharging to Utah Lake, the management instituted several changes in plant operation. These changes resulted in a reduction of approximately 75 percent in the biochemical oxygen demand of the plant effluents.

Recent legislation in the State of Nevada designated the State Board of Health as the water pollution control agency of the State. Earlier legislation conferred upon the State Board of Health general supervision over all matters relating to the preservation of the health of the citizens of the State. As amended, these laws provide authority in the State Board of Health to promulgate reasonable rules and regulations to prevent and control nuisances, regulate sanitation and sanitary practices in the interest of health and provide for the sanitary protection of water and food supplies and the control of sewage disposal.

Other laws in the Nevada statutes make the pollution of lakes, rivers or streams, either generally or by the deposition of specified

substances, a criminal or civil offense. The Attorney General, with the consent of the Governor, is charged with instituting and maintaining actions to prevent or restrain water pollution.

The Wyoming State Legislature considered a bill patterned after the suggested water pollution control act recommended by the Council of State Governments during its last session. However, the legislature passed a much shorter bill that amends and re-enacts a previous section of the Wyoming statutes. This amended and re-enacted section empowers the State Department of Public Health with "the general oversight and care of all inland waters and of all streams, lakes and ponds used by any city, town or public institution or by any water or ice company in this State as sources of water supply for domestic use, and of all springs, streams, and watercourses tributary thereto, with respect to their condition and use as affecting the public health, and any pollution thereof which adversely affects livestock, agricultural crops, wild life, fish or aquatic life is also deemed to affect public health".

"The State Board of Health shall also coordinate the activities of the agencies of the State concerned with water quality". This section also establishes a Water Pollution Council whose primary duty is to advise the State Department of Health in developing a comprehensive program for the prevention, control and abatement of new or existing pollution of the waters of the State.

In Idaho the powers and duties of the State Department of Public Health, the acting water pollution control agency, are quite limited as far as water pollution control is concerned. The functions of the Division of Public Health Engineering are principally advisory and educational in nature. The State Department of Public Health is empowered to conduct water pollution investigations only for the suppression of nuisances.

The following Federal legislation is mentioned because of the financial provisions contained therein for aiding certain water pollution control activities.

Under Section 8(a) of Public Law 845 80th Congress, funds were made available to the State water pollution agencies and the interstate agencies in the form of grants for conducting investigations, research, surveys, and studies related to the control and prevention of water pollution caused by industrial wastes.

Public Law 352, 81st Congress, has made funds available to communities, in the form of non-interest bearing loans, for planning waste treatment works as well as for other public works.

POLLUTION PREVENTION MEASURES REQUIRED

Table H, "Waste Treatment Needs, Municipal", shows that there are 46 municipalities that need either a new plant, an enlargement or addition to the existing plant, or replacement of the existing plant. The waste treatment needs are undetermined for three additional communities. This indicates that 49 of the 54 municipal sources of pollution need, now, or in the near future, improvement in waste treatment facilities.

Table I, "Industrial Waste Pollution Abatement Needs", shows that there are 42 industries that need either a new treatment plant or other pollution control measure, or an enlargement or addition to the existing treatment plant. Waste treatment needs for 64 industries have not been determined. This indicates that 106 of the 114 industrial sources of pollution need, now, or in the near future, improvement in their waste disposal procedures.

Tables J and K show the current status of municipal and industrial action on pollution abatement needs. Very little corrective action is under way in the Basin. Of 106 industries for which waste treatment improvements are indicated only one has undertaken corrective action, while only six of the 49 municipalities having an indicated need for improvements have undertaken any corrective action.

Table L lists the municipalities and industries that require improvements in waste treatment to reduce pollution in the Basin.

There is a definite need at the present time for comprehensive water pollution control laws or regulations in the States represented in the Basin. The Utah and Wyoming legislatures considered comprehensive water pollution control bills at their last sessions but neither bill was enacted. These bills basically followed the suggested water pollution control act recommended by the Council of State Governments. Apparently the failure of favorable action on these bills was due to a lack of appreciation of the need for comprehensive water pollution control legislation for conservation of the State's water resources. The Legislature of the State of Wyoming, however, did pass an act to amend and re-enact Section 63-201, Wyoming Compiled Statutes, 1945.

Neither Idaho nor Nevada has introduced comprehensive water pollution control legislation for legislative consideration. However, the water pollution agencies of both states have given the subject considerable thought. The Nevada Board of Health believes that the State's existing laws provide adequate authority to control water pollution in the state and consideration is being given to development and adoption by the Board of "regulations" for better implementation of the existing laws. The Idaho State Department of Public Health believes the State's present water pollution control laws are inadequate and that the need for a water pollution control program should be given further publicity before control legislation is introduced.

TABLE L
MUNICIPALITIES AND INDUSTRIES NEEDING
IMPROVEMENTS FOR ABATEMENT OF POLLUTION

Date May, 1951

Name and Location	Population* Served	Improvements Needed	Remarks
Franklin, Idaho <u>1/</u> Calif. Packing Co.	150,000E**	New Plant	
Malad, Idaho	1,900	Enlargement	
Montpelier, Idaho	2,000	New Plant	
Paris, Idaho	600	Replacement	
Soda Springs, Idaho	800	New Plant	
Whitney, Idaho <u>1/</u> Franklin Sugar Co.	85,000E**	Enlargement	
Montello, Nevada	300	Replacement	
Amalga, Utah <u>1/</u> Cache Valley Dairy Assn.	2,400	New Plant	
American Fork, Utah <u>1/</u> Arden Dairy	400	New Plant	
Utah Poultry	2,500	New Plant	
American Fork Training School, Utah	700	New Plant	
Bear River City, Utah	100	New Plant	
Bear River High, Utah	600	Replacement	Existing Septic Tank
Black Rock Beach, Utah	3,000	Replacement	Existing Septic Tank deemed Unsatisfactory
Bingham Canyon, Utah	2,500	New Plant	

*For industries the organic waste load is expressed as population equivalent as measured by B.O.D.

**E - estimated.

1/Towns that have industries but do not have sewer systems and were not considered as sources of pollution.

TABLE L (Continued)

Name and Location	Population* Served	Improvements Needed	Remarks
Bountiful, Utah	3,000	Enlargement	
Bountiful Dairy	50	New Plant	
Brigham City, Utah	3,600	Replacement	Existing Septic Tank
Harper Meat Co.	110	New Plant	
Baron Woolen Mills	530	New Plant	
Clearfield, Utah 1/			
Woods Cross Canning Co.	7,600	New Plant	
Corinne, Utah	500	New Plant	
Davis County Metropolitan Sewer Dist., Utah	20,000	New Plant	
Devils Slide, Utah	200	Replacement	Existing Septic Tank
Dugway Proving Ground, Utah	300	Replacement	Area being enlarged Existing Septic Tank
Echo, Utah	63	Replacement	Existing Septic Tank
Farmington, Utah	1,100	Replacement	Existing Septic Tank
Garfield, Utah	800	Enlargement	
Garland, Utah	900	New Plant	
Heber, Utah	700	Enlargement	
Hencfer, Utah	325	Enlargement	
Hyrum, Utah 1/			
E.A. Miller Packing Co.	800	New Plant	
Sego Milk Co.	80	New Plant	
Kaysville, Utah	1,500	Replacement	Existing Septic Tank
Lark, Utah	300	New Plant	

* For industries the organic waste load is expressed as population equivalent as measured by B.O.D.

1/Towns that have industries but do not have sewer systems and were not considered as sources of pollution.

TABLE L (Continued)

Name and Location	Population* Served	Improvements Needed	Remarks
Lehi, Utah 1/ Lehi Roller Mills	220	New Plant	
Lewiston, Utah	500	New Plant	
Logan, Utah	16,802	New Plant	
Magna, Utah	1,200	Enlargement	
Midvale, Utah	3,300	Replacement	Existing Septic Tank
Murray, Utah	1,800	Replacement	Existing Septic Tank
Granite Meat & Livestock	1,570	New Plant	
Murray Laundry	1,400	New Plant	
Rosehill Dairy	82	New Plant	
Nephi, Utah	1,000	None	
Juab County Mills & Elevator	160	New Plant	
North Salt Lake, Utah 1/ Standard Oil of Calif.	Unknown	Enlargement	
Oakley, Utah 1/ Brooklawn Creamery	150	New Plant	
Ogden, Utah	56,910	New Plant	
Ogden Union Stockyards	560	New Plant	
Utah Canning Co.	16,000	New Plant	
Ogden Dressed Meats Co.	4,000	New Plant	
Utah By-Products Co.	Unknown	Enlargement	
Orem, Utah	2,600	Replacement	Existing Septic Tank
Park City, Utah	3,000	New Plant	
Payson, Utah	2,000	Enlargement	Imhoff Overloaded 200%
Dixon Slaughterhouse	180	New Plant	

*For industries the organic waste load is expressed as population equivalent as measured by B.O.D.

1/Towns that have industries but do not have sewer systems and were not considered as sources of pollution.

TABLE L (Continued)

Name and Location	Population* Served	Improvements Needed	Remarks
Pleasant Grove, Utah <u>1</u> / Pleasant Grove Canning Co.	8,000	New Plant	
Provo, Utah	28,000	New Plant	
Republic Creosote Co.	Unknown	New Plant	
John Kuhni & Sons By- Products	Unknown	New Plant	
Richmond, Utah <u>1</u> / Sego Milk Co.	2,260	New Plant	
Riverton, Utah <u>1</u> / Custom Slaughterhouse	300	New Plant	
Saltair Beach, Utah	1,700	New Plant	
Salt Lake City	181,718	New Plant	
Utah Oil Refining Co.	Unknown	Enlargement	
Utah Wool Pulling	Unknown	New Plant	
Salt Lake County Boat Har., Utah	150	Replacement	Existing Septic Tank
Sandy, Utah	150	Enlargement	
South Ogden, Utah	3,000	Replacement	Existing Septic Tank
South Salt Lake, Utah <u>2</u> / Joe Doctorman & Co.	80	New Plant	
Jordan Meat & Livestock	580	New Plant	
Granite School Dist. Cannery	900	New Plant	
Archie McFarland & Sons	7,700	New Plant	
Joe Doctorman & Son	1,900	New Plant	
Spanish Fork, Utah	4,300	New Plant	
Rendall James Slaughterhouse	130	New Plant	
Neil Thomas Slaughterhouse	250	New Plant	
Jex Slaughterhouse	220	New Plant	
Utah Hide & Tallow Co.	Unknown	New Plant	

*For industries the organic waste load is expressed as population equivalent as measured by B.O.D.

1/Towns that have industries but do not have sewer systems and were not considered as sources of pollution.

2/Sewage collected and disposed of with Salt Lake City.

TABLE L (Continued)

Name and Location	Population* Served	Improvements Needed	Remarks
Springville, Utah	2,000	New Plant	
Sunset Beach, Utah	4,500	New Plant	
Taylorsville, Utah	350	Replacement	Existing Septic Tank
Toole, Utah	3,900	Replacement	Existing Septic Tank
Tremonton, Utah	1,600	Replacement	Existing Septic Tank
Allen Meat Co.	250	New Plant	
Wellsville, Utah	500	New Plant	
West Jordan, Utah <u>1/</u>			
Hogan Dairy	25	New Plant	
Woods Cross, Utah <u>1/</u>			
Wasatch Oil Refinery	Unknown	Enlargement	

*For industries the organic waste load is expressed as population equivalent as measured by B.O.D.

1/Towns that have industries but do not have a sewer system and were not considered as sources of pollution.

APPENDIX TO GREAT SALT LAKE

BASIN REPORT

STATE OF IDAHO
DEPARTMENT OF PUBLIC HEALTH
DIVISION OF ENVIRONMENTAL SANITATION
H. C. CLARK, M.D., Chief, Div.

BOISE, IDAHO

July 13, 1951

Mr. F. E. DelMartini
Senior Sanitary Engineer
Public Health Service
California & Great Basin
Drainage Basin Office
441 Federal Office Building
San Francisco 2, California

Dear Mr. DelMartini:

Attached are comments from the three interested departments of Idaho who have reviewed your Preliminary Report.

In reference to the California Packing Company at Franklin, Idaho, I have checked our 1156 form and find that the 1 of the 150,000 and the 2 of 250,000 actually referred to the footnotes, but these superscripts were placed ahead of instead of behind the number, thereby causing confusion. The bean canning season lasts for two to three months and the pea canning season is about six weeks long. I think that the new figure of 150,000 P. A. is satisfactory in this case.

We would like to keep one copy of this Preliminary Report with the understanding that no part of its contents shall be made public. Please send us your instructions as to the disposal of the other two copies of the report. The three departments who reviewed this report have indicated that they would like a copy of the final report, and it would be greatly appreciated if you can provide each of them with one.

Very truly yours,

Alfred Alexander
Alfred Alexander
Public Health Engineer

AA:ejl

Nevada State Department of Health

DIVISION OF PUBLIC HEALTH ENGINEERING
AND VETERINARY
RESEARCH

October 4, 1951

Mr. F. E. DelMartini
Senior Sanitary Engineer
Officer in Charge
California & Great Basin Drainage Basin Office
441 Federal Office Bldg.,
San Francisco 2, California

Dear Mr. DelMartini:

We have now received all the comments and letters of clearance from those agencies that reviewed the "Report on Water Pollution in the Great Salt Lake Sub-basin, May 1951." We are enclosing copies of these letters for your information and files. The comments of these agencies are very general and will not necessitate any revision of the report.

It is our understanding that you wish to immediately publish this report. We will be glad to cooperate in the distribution in any manner you deem advisable.

Very truly yours,

W. W. White, Director

W: *W. W. White*
W. W. White, Engineer

THE STATE OF WYOMING
Department of Public Health
FRANKLIN D. YODER, M.D., M.P.H., DIRECTOR
STATE CAPITAL, CHEYENNE

DIVISION OF
ENVIRONMENTAL SANITATION

L. G. WILLIAMS

June 26, 1951

Mr. F. E. DelMartini
Senior Sanitary Engineer
Officer in Charge
California and Great Basin Drainage Basin Office
441 Federal Office Building
San Francisco 2, California

Dear Mr. DelMartini:

We have reviewed the Preliminary Report on Water Pollution in the Great Salt Lake Sub-basin sent to us from your office. We have the following suggestions to make:

On page 31 the source of Evanston's water supply is given as wells and spring. This should be wells and stream. Also on the same line the treatment for this supply is given as none. The supply is chlorinated.

The last sentence on page 68 states that the Wyoming legislature failed to pass a water pollution control bill for this state. The legislature did pass a water pollution control bill at their last meeting. The bill passed is considerably shorter than the one originally submitted, but it is definitely a step in the right direction. We are enclosing a copy of this bill for your files.

Other than the above we have no corrections or suggestions.

Very truly yours,

L. G. Williams
L. G. Williams, Engineer in Charge
Water Pollution Control Section

ADR/rc
Enclosure



UTAH STATE DEPARTMENT OF HEALTH

SALT LAKE CITY

September 1, 1951

Mr. F. E. DelMartini, Officer in Charge,
California & Great Basin Drainage Basin Office,
441 Federal Office Building,
San Francisco, California.

Dear Mr. DelMartini:

We have checked the Great Salt Lake Sub-basin Report and wish to express our approval of it as now written.

It is suggested that consideration be given to the following minor revision:

Page 27, third paragraph, first line. Change "northern" to "eastern."

Very truly yours,

STATE DEPARTMENT OF HEALTH

Lynde W. Thibauer
Lynde W. Thibauer, Director
Division of Sanitary Engineering

LWT:W

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TABLE 1
BASIC DATA ON SOURCES OF MUNICIPAL* POLLUTION
GREAT BASIN
Great Salt Lake Basin

Name and Location	River Mile Above Mouth of Str.	Population Served by Sewers	P.E. (B.O.D.) Untreated Wastes**	Waste Treatment Provided	Adequacy of Treatment Facilities		P.E. (B.O.D.) Disch'd. to Water-course**	Treatment Needs	Current Status Municipal* Action
					Cap'y	Op'r.			
Great Salt Lake									
Bear River Enters									
Box Elder Creek Enters									
Weber River Enters									
1. Davis Co. Muni. Sew. Dist., Utah		20,000	34,000	None	-	-	34,000	New Plant	Inactive
2. Kaysville, Utah		1,500	1,500	Minor	Undet.	Undet.	1,400	Replace	Inactive
3. Farmington, Utah		1,100	1,100	Minor	Undet.	Undet.	1,000	Replace	Inactive
4. Bountiful, Utah		3,000	3,000	Primary	Undet.	Undet.	2,100	Enlargement	Inactive
Jordan River Enters									
5. Salt Lake City, Utah		181,718	229,000	None	-	-	289,000	New Plant	Inactive
6. Baccus, Utah		150	150	Secondary	Satis.	Satis.	0	None	Inactive
7. Saltair Beach, Utah		1,700	800	None	-	-	800	New Plant	Inactive
8. Magna, Utah		3,000	3,000	Primary	Undet.	Undet.	2,400	Enlargement	Inactive
9. Garfield, Utah		800	800	Primary	Satis.	Undet.	560	Enlargement	Inactive

*Includes incorporated or unincorporated municipalities; other legal bodies as sanitary districts, counties, towns; significant institutions, resorts, recreational centers or other population centers.

**Includes industrial wastes discharged into municipal sewerage systems.

TABLE 1 (Cont.)

Name and Location	River Mile Above Mouth of Outlet Str.	Popula- tion Served by Sewers	P.E. (B.O.D.) Untreated Wastes**	Waste Treatment Provided	Adequacy of Treatment Facilities		P.E. (B.O.D.) Disch'd. to Water- course**	Treatment Needs	Current Status Municipal* Action
					Cap'y	Op'r.			
10. Salt Lake Co., Boat Harbor, Utah		150	75	Minor	Undet.	Undet.	70	Replace	Inactive
11. Sunset Beach, Utah		4,500	2,000	None	-	-	2,000	New Plant	Inactive
12. Black Rock Beach, Utah		3,300	1,500	Minor	Undet.	Undet.	1,400	Replace	Inactive
13. Tooele, Utah		3,500	3,500	Minor	Unsat.	Unsat.	3,300	Replace	Inactive
14. Tooele Ord., Utah		3,100	3,100	Primary	Undet.	Undet.	2,200	Undetermined	Inactive
15. Western Chem- ical, Utah		900	900	Primary	Undet.	Undet.	625	Undetermined	Inactive
16. Dugway Prov- ing Grds., Utah		300	300	Primary	Undet.	Undet.	210	Replace	Inactive
17. Wendover, Utah		1,000	1,000	None	-	-	1,000	Undetermined	Inactive
Bear River									
18. Evanston, Wyoming		3,800	3,800	Primary	Satis.	Satis.	2,000	None	Inactive
Montpelier Creek Enters Bear Lake Out- let Enters									
19. Soda Springs, Idaho		800	800	None	-	-	800	New Plant	Inactive
20. Conda, Idaho		300	300	Primary	Satis.	Satis.	150	None	Inactive

*Includes incorporated or unincorporated municipalities; other legal bodies as sanitary districts, counties, towns; significant institutions, resorts, recreational centers or other population centers.

**Includes industrial wastes discharged into municipal sewerage systems.

TABLE 1 (Cont.)

Name and Location	River Mile Above Mouth of Outlet Str.	Population Served by Sewers	P.E. (B.O.D.) Untreated Wastes**	Waste Treatment Provided	Adequacy of Treatment Facilities		P.E. (B.O.D.) Disch'd. to Water-course**	Treatment Needs	Current Status Municipal Action
Cub River Enters Little Bear River Enters					Cap'y	Op'r.			
21. Bear River City, Utah		100	100	None	-	-	100	New Plant	Inactive
Malade River Enters Corinne, Utah		500	500	None	-	-	500	New Plant	Inactive
Montpelier Creek		2,000	2,000	None	-	-	2,000	New Plant	Final Plans Approved
23. Montpelier, Idaho									
Bear Lake Outlet									
Paris Creek Enters									
24. Paris, Idaho		600	600	Minor	Unsat.	Unsat.	450	Replacement	Inactive
Cub River									
25. Preston, Idaho		4,000	5,900	Primary	Satis.	Satis.	4,100	None	Inactive
26. Lewiston, Utah		500	500	None	-	-	500	New Plant	Inactive
Little Bear River									
27. Wellsville, Utah		500	500	None	-	-	500	New Plant	Inactive

*Includes incorporated or unincorporated municipalities; other legal bodies as sanitary districts, counties, towns; significant institutions, resorts, recreational centers or other population centers.

**Includes industrial wastes discharged into municipal sewerage systems.

TABLE 1 (Cont.)

Name and Location	River Mile Above Mouth	Popula- tion Served by Sewers	P.E. (B.O.D.) Untreated Wastes**	Waste Treatment Provided	Adequacy of Treatment Facilities		P.E. (B.O.D.) Disch'd. to Water- course**	Treatment Needs	Current Status Municipal* Action
					Cap'y	Op'r.			
Logan River Enters Malad River		1,900	1,900	Primary	Satis.	Unsat.	1,425	Enlargement New Plant	Inactive
28. Malad, Idaho		900	900	None	-	-	900		Inactive
29. Garland, Utah		1,200	600	Minor	Unsat.	Unsat.	550	Replace	Inactive
30. Bear River		1,600	18,000	Minor	Unsat.	Unsat.	17,850	Replace	Inactive
High, Utah									
31. Tremonton, Utah		16,802	22,000	None	-	-	22,000	New Plant	Inactive
Logan River									
32. Logan, Utah		3,600	3,600	Minor	Unsat.	Unsat.	3,400	Replace	Active Planning
Box Elder Creek									
33. Brigham City, Utah									
Weber River									
Silver Creek									
Enters									
34. Echo, Utah		63	63	Minor	Undet.	Undet.	60	Replace	Inactive
35. Henefer, Utah		187	187	Primary	Unsat.	Unsat.	130	Enlargement	Inactive
36. Devil's Slide, Utah		200	200	Minor	Unsat.	Unsat.	120	Replace	Inactive
37. South Ogden, Utah		3,000	3,000	Minor	Unsat.	Unsat.	2,800	Replace	Active Planning
38. Ogden, Utah		56,910	169,500	None	-	-	169,500	New Plant	Active Planning
Silver Creek									
39. Park City, Utah		600	600	None	-	-	600	New Plant	Inactive

*Includes incorporated or unincorporated municipalities; other legal bodies as sanitary districts, counties, towns; significant institutions, resorts, recreational centers or other population centers.

**Includes industrial wastes discharged into municipal sewerage systems.

TABLE 1 (Cont.)

Name and Location	River Mile Above Mouth of Outlet Str.	Popula- tion Served by Sewers	P.E. (B.O.D.) Untreated Wastes**	Waste Treatment Provided	Adequacy of Treatment Facilities		P.E. (B.O.D.) Disch'd. to Water- course**	Treatment Needs	Current Status Municipal* Action
					Cap'y	Op'r.			
Jordan River		1,500	1,500	Primary	Undet.	Undet.	1,050	Enlarge	Inactive
40. Sandy, Utah Bingham Creek Enters		3,300	3,300	Minor	Unsat.	Unsat.	3,100	Replace	Inactive
41. Midvale, Utah		350	350	Minor	Unsat.	Unsat.	330	Replace	Inactive
42. Taylorsville, Utah		1,800	3,500	Minor	Unsat.	Unsat.	3,300	Replace	Active Planning
43. Murray, Utah Bingham Creek		2,500	2,500	None	-	-	2,500	New Plant	Inactive
44. Bingham Canyon, Utah		300	300	None	-	-	300	New Plant	Inactive
45. Lark, Utah Utah Lake Monte Creek Enters		2,600	2,600	Minor	Unsat.	Unsat.	2,400	Replace	Inactive
Payson Slough Enters									
Dry Creek Enters									
Spring Creek Enters									
Mill Creek Enters									
Provo River Enters									
46. Orem, Utah American Fork River Enters									

*Includes incorporated or unincorporated municipalities; other legal bodies as sanitary districts, counties, towns, significant institutions, resorts, recreational centers or other population centers.

**Includes industrial wastes discharged into municipal sewerage systems.

TABLE 1 (Cont.)

Name and Location	River Mile Above Mouth of Outlet Str.	Population Served by Sewers	P.E. (B.O.D.) Untreated Wastes**	Waste Treatment Provided	Adequacy of Treatment Facilities		P.E. (B.O.D.) Disch'd. to Water-course**	Treatment Needs	Current Status Municipal* Action
					Cap'y	Op'r.			
47. American Fork Training School, Utah		700	700	None	-	-	700	New Plant	Under Construction
Monna Creek									
Nephi Creek Enters									
Nephi Creek		1,000	1,000	Secondary	Satis.	Satis.	100	None	Inactive
48. Nephi, Utah		2,000	2,000	Primary	Unsat.	Unsat.	1,800	Enlargement	Inactive
Payson Slough									
49. Payson, Utah		4,300	4,300	None	-	-	4,300	New Plant	Inactive
Dry Creek		2,000	2,000	None	-	-	2,000	New Plant	Inactive
50. Spanish Fork, Utah		28,000	38,000	None	-	-	38,000	New Plant	Inactive
Spring Creek									
51. Springville, Utah		700	700	Primary	Unsat.	Unsat.	490	Enlargement	Inactive
Mill Creek		300	300	Minor	Unsat.	Satis.	270	Replacement	Inactive
52. Provo, Utah									
Provo River									
53. Heber, Utah									
54. Montello, Nevada									
Totals		381,130	644,325				633,140		

*Includes incorporated or unincorporated municipalities; other legal bodies as sanitary districts, counties, towns; significant institutions, resorts, recreational centers or other population centers.

**Includes industrial wastes discharged into municipal sewerage systems.

TABLE 2
BASIC DATA ON SOURCES OF INDUSTRIAL* POLLUTION
GREAT BASIN
Great Salt Lake Basin

Name and Location	Type Industry	Type Waste Produced	Treatment or Other Pollution Control Measures:		Est. P.E. (B.O.D.) Disch'd. to Watercourse	Pollution Abatement Needs	Current Status Industrial* Action
			Degree	Adequacy Cap'y Opr.			
Great Salt Lake							
Bear River Enters							
Box Elder Creek Enters							
1. Perry Canning Co., Perry, Utah	Food	Organic	None	-	4,000	Undetermined	Inactive
2. Golden Gem Potatoe Chip Co., North Ogden, Utah	Food	Organic	None	-	65	Undetermined	Inactive
3. No. Ogden Canning Co., North Ogden, Utah	Food	Organic	Minor	Undet. Undet.	8,750	Undetermined	Inactive
Weber River Enters							
4. Smith Canning Co., Clearfield, Utah	Food	Organic	Minor	Undet. Undet.	8,000	Undetermined	Inactive
5. Woods Cross Canning Co., Clearfield, Utah	Food	Organic	None	-	7,600	New Plant	Inactive
6. Kaysville Cannery Co., Syracuse, Utah	Food	Organic	Minor	Undet. Undet.	6,000	Undetermined	Inactive
7. Layton Sugar Co., Layton, Utah	Food	Organic	None	-	80,000	Undetermined	Inactive
8. Kaysville Cannery, Kaysville, Utah	Food	Organic	None	Undet. Undet.	13,000	Undetermined	Inactive
9. Smoot Dairy, Centerville, Utah	Food	Organic	Minor	Undet. Undet.	20	Undetermined	Inactive
10. Bountiful Dairy, Bountiful, Utah	Food	Organic	None	-	50	New Plant	Inactive

*Industries having separate outlets and discharging wastes directly to watercourse.

TABLE 2 (Cont.)

Name and Location	Type Industry	Type Waste Produced	Treatment or Other Pollution Control Measures:			Est. P.E. (B.O.D.) Disch'd. to Watercourse	Pollution Abatement Needs	Current Status Industrial* Action
			Degree	Cap'y	Adequacy Opr.			
Jordan River Enters								
11. Moss Dairy, Woodf Cross, Utah	Food	Organic	None	-	-	20	Undetermined	Inactive
12. Holbrook Dairy, Woods Cross, Utah	Food	Organic	Intermediate	Satis.	Undet.	40	None	Inactive
13. Wasatch Oil Ref., Woods Cross, Utah	Petroleum	Organic	Minor	Undet.	Undet.	Unknown	Enlargement	Inactive
14. Western States Ref., No. S. L., Utah	Petroleum	Organic	Minor	Undet.	Undet.	Unknown	Undetermined	Inactive
15. Cudahy Pkg. Co., No. S. L., Utah	Food	Organic	None	-	-	15,000	Undetermined	Inactive
16. Standard Oil of Cal., No. S. L., Utah	Petroleum	Organic	Minor	Undet.	Undet.	Unknown	Enlargement	Inactive
17. U.P.R.R., Salt Lake City, Utah	Misc.	Undeter.	None	-	-	Unknown	Undetermined	Inactive
18. Utah Oil Ref. Co., S. L. C., Utah	Petroleum	Organic	Minor	Undet.	Unsat.	Unknown	Enlargement	Inactive
19. Saltair Salt Plant, S. L. C., Utah	Misc.	Undeter.	None	-	-	Unknown	Undetermined	Inactive
20. Magna Mill, Magna, Utah	Other Mine, Other Mine, Other Mine	Undeter.	Minor	Undet.	Undet.	Unknown	Undetermined	Inactive
21. Arthur Mill, Garfield, Utah	Other Mine, Other Mine, Other Mine	Undeter.	Minor	Undet.	Undet.	Unknown	Undetermined	Inactive
22. Kennicott Copper Co., Garfield, Utah	Other Mine, Other Mine, Other Mine	Undeter.	Minor	Undet.	Undet.	Unknown	Undetermined	Inactive
23. Amer. Smelting & Ref. Co., Garfield, Utah	Other Mine, Other Mine, Other Mine	Undeter.	Minor	Undet.	Undet.	Unknown	Undetermined	Inactive
24. Fellers Meat Pkg. Co., Tooele, Utah	Food	Organic	None	-	-	Unknown	Undetermined	Inactive
			Intermediate	Satis.	Satis.	110	None	Inactive

*Industries having separate outlets and discharging wastes directly to watercourse.

TABLE 2 (Cont.)

Name and Location	Type Industry	Type Waste Produced	Treatment or Other Pollution Control Measures:			Est. P.E. (B.O.D.) Disch'd. to Watercourse	Pollution Abatement Needs	Current Status Industrial* Action
			Degree	Adequacy	Opr.			
25. International Smelt Co., Tooele, Utah	Mine Other	Undeter.	Minor	Undet.	Undet.	Unknown	Undetermined	Inactive
26. Combined Metals Reduction Co., Stockton, Utah	Mine (Dr. Other)	Undeter.	Minor	Undet.	Satis.	Unknown	Undetermined	Inactive
27. Bonneville Ltd., Wendover, Utah	Misc.	Undeter.	None	-	-	Unknown	Undetermined	Inactive
Bear River								
28. Grace Cheese Factory, Grace, Idaho	Food	Organic	Undeter.	Unknown	Unknown	60	Undetermined	Inactive
29. Thatcher Cheese Factory, (Gem Valley Dairymen's Assn.), Thatcher, Idaho	Food	Organic	Undeter.	Unknown	Unknown	80	Undetermined	Inactive
30. Cache Valley Dairy Assn., Amalga, Utah	Food	Organic	None	-	-	2,400	New Plant	Inactive
31. Cal. Packing Co., Smithfield, Utah	Food	Organic	Minor	Undet.	Undet.	35,200	Undetermined	Inactive
Little Bear River Enters								
Malad River Enters								
Bear Lake Outlet								
Paris Creek Enters								
Paris Creek								
32. Cheese Factory, (Bear Lake Valley Dairymen's Assn.), Paris, Idaho	Food	Organic	Undeter.	Unknown	Unknown	150	Undetermined	Inactive

*Industries having separate outlets and discharging wastes directly to watercourse.

TABLE 2 (Cont.)

Name and Location	Type Industry	Type Waste Produced	Treatment or Other Pollution Control Measures:			Est. P.E. (B.O.D.) Disch'd. to Watercourse	Pollution Abatement Needs	Current Status Industrial* Action
			Degree	Adequacy Cap'y	Opr.			
Cub River								
33. Calif. Packing Co., Franklin, Idaho	Food	Organic	None	-	-	150,000	New Plant	Inactive
Worm Creek Enters								
34. Amalgamated Sugar Co., Lewiston, Utah	Food	Organic	Minor	Undet.	Undet.	208,000	Undetermined	Inactive
35. Sego Milk Co., Richmond, Utah	Food	Organic	None	-	-	2,260	New Plant	Inactive
Worn Creek								
36. Franklin Sugar Co., Whitney, Idaho	Food	Organic	Minor	Unsat.	Unsat.	85,000	Enlargement	Inactive
Little Bear River								
37. E. A. Miller Pkg. Co., Hyrum, Utah	Food	Organic	None	-	-	800	New Plant	Inactive
38. L. L. Miller Pkg. Co., Hyrum, Utah	Food	Organic	Minor	Undet.	Undet.	340	Undetermined	Inactive
39. Sego Milk Prod. Co., Hyrum, Utah	Food	Organic	None	-	-	80	New Plant	Inactive
40. Morning Milk Co., Wellsville, Utah	Food	Organic	Minor	Undet.	Undet.	830	Undetermined	Inactive
Malad River								
41. Utah By-Prod., Garland, Utah	Food	Organic	Minor	Undet.	Undet.	130	Undetermined	Inactive
42. U & I Sugar Co., Garland, Utah	Food	Organic	Minor	Undet.	Undet.	200,000	Undetermined	Inactive
43. Allen Meat Co., Tremonton, Utah	Food	Organic	None	-	-	250	New Plant	Inactive
Box Elder Creek								
44. Harper Meat Co., Brigham City, Utah	Food	Organic	None	Undet.	Undet.	110	New Plant	Inactive

*Industries having separate outlets and discharging wastes directly to watercourse.

TABLE 2 (Cont.)

Name and Location	Type Industry	Type Waste Produced	Treatment or Other Pollution Control Measures:			Est. P.E. (B.O.D.) Disch'd. to Watercourse	Pollution Abatement Needs	Current Status Industrial* Action
			Degree	Adequacy				
				Cap'y.	Op'r.			
45.Box Elder Pkg. Co., Brigham City, Utah	Food	Organic	Minor	Undet.	Undet.	14,700	Undetermined	Inactive
46.Baron Woolen Mills, Brigham City, Utah Weber River	Textile	Organic	None	-	-	530	New Plant	Inactive
47.Brooklawn Creamery Oakley, Utah	Food	Organic	None	-	-	150	New Plant	Inactive
48.U.P.R.R., Echo, Utah	Misc.	Undeter.	None	-	-	Unknown	Undetermined	Inactive
49.Ideal Cement Co., Devils Slide, Utah	Misc.	Inorganic	Undeter.	Unknown	Unknown	Unknown	Undetermined	Inactive
50.Cal. Pack. Co., Morgan, Utah	Food	Organic	None	-	-	1,000	Undetermined	Inactive
51.Morgan School Community Canning Center, Morgan, Utah	Food	Organic	None	-	-	208	Undetermined	Inactive
52.So. Ogden Produce Co., So. Ogden, Utah	Food	Organic	Inter- mediate	Satis.	Satis.	4,500	None	Inactive
53.Parke & Sons Pkg. Co., Ogden, Utah	Food	Organic	None	-	-	3,030	Undetermined	Inactive
54.Turkey Dressing Plant } Ogden, } Utah	Food	Organic	Minor	Unknown	Unknown	1,390	Undetermined	Inactive
54.Armour Creamery 55.Ogden Union Stock Yds., Ogden, Utah	Food Misc.	Organic Undeter.	None Minor	- Unknown	- Unknown	560 Unknown	New Plant Undetermined	Inactive Inactive
56.U.P.R.R., Ogden, Utah	Misc.	Undeter.	None	-	-	Unknown	Undetermined	Inactive
57.Utah Ice Plant, Ogden, Utah								Active Planning
58.Utah Canning Co., Ogden, Utah	Food	Organic	Minor	Unsat.	Satis.	16,000	New Plant	

*Industries having separate outlets and discharging wastes directly to watercourse.

TABLE 2 (Cont.)

Name and Location	Type Industry	Type Waste Produced	Treatment or Other Pollution Control Measures:			Est. P.E. (B.O.D.) Disch'd. to Water-course	Pollution Abatement Needs	Current Status Industrial* Action
			Degree	Cap'y.	Adequacy Opr.			
59. Swift & Co., Ogden, Utah	Food	Organic	Minor	Unknown	Unknown	27,200	Undetermined	Inactive
60. Cal. Pack. Co., Ogden, Utah	Food	Organic	Minor	Unknown	Unknown	46,500	Undetermined	Inactive
61. Ogden Dressed Meats Co., Ogden, Utah	Food	Organic	None	-	-	4,000	New Plant	Inactive
62. Utah By-Products, Ogden, Utah	Food	Organic	None	-	-	Unknown	Enlargement	Inactive
63. Quaker Oats Co., Ogden, Utah	Food	Organic	Minor	Unknown	Unknown	1,800	Undetermined	Inactive
64. Solor Corporation, Ogden, Utah	Misc.	Inorganic	Minor	Unknown	Unknown	Unknown	Undetermined	Inactive
65. Ogden Union R.R., Ogden, Utah	Misc.	Undeter.	None	-	-	Unknown	Undetermined	Inactive
66. S.P.R.R., Ogden, Utah	Misc.	Undeter.	Minor	Unknown	Unknown	Unknown	Undetermined	Inactive
67. Silver King Mill, Park City, Utah	(Dr. Mine (Other	Undeter.	None	-	-	Unknown	Undetermined	Inactive
Jordan River								
68. Custom Slaughter, Riverton, Utah	Food	Organic	None	-	-	300	New Plant	Inactive
69. Draper Egg. Prod., Draper, Utah	Food	Organic	Minor	Unknown	Unknown	1,250	Undetermined	Inactive
Bingham Creek Enters								
70. A. Bill & Co., Midvale, Utah	Food	Organic	Inter-mediate	Unknown	Unknown	120	Undetermined	Inactive
71. Hunt Foods, Murray, Utah	Food	Organic	Minor	Unknown	Unknown	3,500	Undetermined	Inactive
72. Jordan Valley Region Church Welfare, Murray, Utah	Food	Organic	Inter-mediate	Satis.	Satis.	500	None	Inactive

*Industries having separate outlets and discharging wastes directly to watercourse.

TABLE 2 (Cont.)

Name and Location	Type Industry	Type Waste Produced	Treatment or Other Pollution Control Measures:			Est. P. E. (B.O.D.) Disch'd. to Watercourse	Pollution Abatement Needs	Current Status Industrial* Action
			Degree	Cap'y.	Adequacy Opr.			
Big Cottonwood Creek Enters								
73 Winder Dairy, So. S. L., Utah	Food	Organic	Intermediate	Unknown	Unknown	300	Undetermined	Inactive
74 Joe Doctorman & Co., So. S. L., Utah	Food	Organic	None	-	-	80	New Plant	Inactive
75 Jordan Meat & Livestock Co., So. S. L., Utah	Food	Organic	None	-	-	580	New Plant	Inactive
Mill Creek Enters								
Bingham Creek								
76 U & I Sugar Co., W. Jordan, Utah	Food	Organic	Minor	Unknown	Unknown	93,000	Undetermined	Inactive
77 Hogan Dairy, W. Jordan, Utah	Food	Organic	None	-	-	25	New Plant	Inactive
Big Cottonwood Creek								
78 Murray Laundry, Murray, Utah	Misc.	Organic	None	-	-	1,400	New Plant	Inactive
79 Roschill Dairy, Murray, Utah	Food	Organic	None	-	-	82	New Plant	Inactive
80 Granite Meat & Livestock, Murray, Utah	Food	Organic	None	-	-	1,570	New Plant	Inactive
81 Murray Meat & Livestock, Murray, Utah	Food	Organic	None	-	-	1,600	Undetermined	Inactive
Mill Creek								
82 Granite School Dist. Cannery, So. S. L., Utah	Food	Organic	None	-	-	900	New Plant	Inactive
83 Archie McFarland & Sons, So. S. L., Utah	Food	Organic	Minor	Unknown	Unknown	7,700	New Plant	Inactive
84 Joe Doctorman & Sons, So. S. L., Utah	Food	Organic	None	-	-	1,900	New Plant	Inactive

*Industries having separate outlets and discharging wastes directly to watercourse.

TABLE 2 (Cont.)

Name and Location	Type Industry	Type Waste Produced	Treatment or Other Pollution Control Measures:			Est. P. E. (B.O.D.) Disch'd. to Water-course	Pollution Abatement Needs	Current Status Industrial* Action
			Degree	Cap'y	Adequacy Oppr.			
Utah Lake								
Mona Creek Enters								
Payson Slough Enters								
Spanish Fork River Enters								
Dry Creek Enters								
Spring Creek Enters								
Drainage Canal Enters								
Mill Creek Enters								
Frovo River Enters								
85. Pleasant Grove Canning Co., Orem, Utah	Food	Organic	Minor	Unknown	Unknown	31,500	Undetermined	Inactive
86. Geneva Steel Co., Orem, Utah	Metal	Organic & Inorganic	Intermediate	Unknown	Unknown	49,000	Undetermined	Active Planning
87. Pleasant Grove Canning Co., Pleasant Grove, Utah	Food	Organic	None	-	-	8,000	New Plant	Inactive
88. Lehi Roller Mills, Lehi, Utah	Food	Organic	None	-	-	220	New Plant	Inactive
Payson Slough								
89. Dixon Slaughterhouse, Payson, Utah	Food	Organic	None	-	-	180	New Plant	Inactive
Spanish Fork River								
90. Illinois Powder Co., Sp. Fork, Utah	Misc.	Undeter.	None	-	-	Unknown	Undetermined	Inactive
91. Randall James Slaughterhouse, Sp. Fork, Utah	Food	Organic	None	-	-	130	New Plant	Inactive
92. Cal. Pack. Co., Sp. Fork, Utah	Food	Organic	Minor	Unknown	Unknown	11,000	Undetermined	Inactive
93. Neil Thomas Slaughterhouse, Sp. Fork, Utah	Food	Organic	None	-	-	250	New Plant	Inactive

*Industries having separate outlets and discharging wastes directly to watercourse.

TABLE 2 (Cont.)

Name and Location	Type Industry	Type Waste Produced	Treatment or Other Pollution Control Measures:			Est. P.E. (B.O.D.) Disch'd. to Watercourse	Pollution Abatement Needs	Current Status Industrial* Action
			Degree	Cap'y.	Adequacy Opr.			
94. Jax Slaughterhouse, Sp. Fork, Utah	Food	Organic	None	-	-	220	New Plant	Inactive
95. Utah Hide & Tallow Co., Sp. Fork, Utah	Food	Organic	Minor	Unsat.	Unknown	Unknown	New Plant	Inactive
96. Eddington Cannery, Springville, Utah	Food	Organic	Minor	Unknown	Unknown	6,000	Undetermined	Inactive
97. Utah Grovers Coop., Springville, Utah	Food	Organic	None	-	-	Unknown	Undetermined	Inactive
98. Ironton Plant, Provo, Utah	Mine (Other)	Undeter.	Minor	Unknown	Unknown	Unknown	Undetermined	Active Planning
99. Utah County Pkg. Co., Provo, Utah	Food	Organic	Minor	Unknown	Unknown	500	Undetermined	Inactive
100. Republic Creosote Plant, Provo, Utah	Petroleum Metal (Fab)	Organic	Minor	Unknown	Unknown	Unknown	New Plant	Inactive
101. Pacific States Cast Iron Pipe, Provo, Utah	Food	Inorganic	Minor	Unknown	Unknown	Unknown	Undetermined	Inactive
102. John Kuhn & Sons By-Prod., Provo, Utah	Food	Organic	None	-	-	Unknown	New Plant	Inactive
103. Utah By-Products, Heber, Utah	Food	Organic	Intermediate	Satis.	Satis.	200	None	Inactive
104. Wasatch Meat Co., Heber, Utah	Food	Organic	Minor	Satis.	Satis.	180	None	Inactive
105. Heber Mercantile Slaughterhouse, Heber, Utah	Food	Organic	Minor	Satis.	Satis.	720	None	Inactive
106. Cascade Fish Co., Charleston, Utah	Food	Organic	Intermediate	Satis.	Satis.	0	None	Inactive

*Industries having separate outlets and discharging wastes directly to watercourse.

TABLE 2 (Cont.)

Name and Location	Type Industry	Type Wastes Produced	Treatment or Other Pollution Control Measures:			Est. P.E. (B.O.D.) Disch'd. to Watercourse	Pollution Abatement Needs	Current Status Industrial* Action
			Degree	Adequacy Cap'y.	Op'r.			
07. Sherron Industries, Provo, Utah American Fork River	Food	Organic	Intermediate	Unknown	Unknown	370	Undetermined	Inactive
08. Arden Dairy, American Fork, Utah	Food	Organic	None	-	-	400	New Plant	Inactive
09. Utah Growers Coop., American Fork, Utah	Food	Organic	Minor	Unknown	Unknown	Unknown	Undetermined	Inactive
10. Utah Poultry Co., American Fork, Utah	Food	Organic	Minor	Unsat.	Unsat.	2,500	New Plant	Inactive
11. Utah Wool Pulling Co., Salt Lake City, Utah	Misc.	Undeter.	None	-	-	Unknown	New Plant	Inactive
12. Linde Air Products, Salt Lake City, Utah	Chemical	Inorganic	Undeter.	Unknown	Unknown	Unknown	Undetermined	Inactive
13. Nephi Creek Enters Nephi Creek								
14. Herbert Winn's Slaughterhouse, Nephi, Utah	Food	Organic	None	-	-	400	Undetermined	Inactive
15. Jacob Co. Mills & Elevator Co., Nephi, Utah	Food	Organic	None	-	-	160	New Plant	Inactive

*Industries having separate outlets and discharging wastes directly to watercourse.

TABLE 3

HYDROLOGIC DATA

(Data from "Surface Water Supply of the United States Part 10",
Geological Survey, Dept. of the Interior)

Station	Location	Period of Record	Flow in Second Feet & Date of Occurrence			
			Maximum	Minimum	Lowest Mean Flow	
					Monthly	Seven Consecutive Days
<u>BEAR RIVER</u>						
Utah - Wyoming	Just downstream from West Fork, 2.8 mi. upstream from Utah-Wyoming State line	1943-47	1,780 5-7-47	20 4/2/44	28 Dec. 1944	25 3/28-4/3/44 12/9-20/44
Millie, Wyoming	4.6 mi. downstream from Stowe Creek, 5.5 mi. up- stream from Sulphur Creek	1943-47	2,000 6/2/43	0 9/23-26/43	2 Aug. 1944	0.2 9/21-27/43
Evanston, Wyoming	300' upstream from Hinny Bridge, 3½ mi. NW of Evanston	1940-47	2,640 6/2/43	0 8/1-31/40	0 Aug. 1940	0 8/1-31/40
Woodruff, Utah	2.8 mi. upstream from Utah-Wyoming State line, 7.6 mi. east of Woodruff	1943-47	1,940 3/18/47	0 10/1-27/42 8/22-9/30/44	0 Sept. 1944	0 10/1-27/42 8/22-9/30/44
Randolph, Utah	4.2 mi. upstream from Twin Creek, 11 mi. NE of Randolph	1944-47	1,600 6/14/47	23 10/21/44	26 Oct. 1944	24 10/25-31/44
Border, Wyoming	½ mi. W. Wyoming State line, ½ mi. W. of Border	1940-47	2,040 4/3/42 6/18/47	30 8/18-22/40	38.5 Sept. 1940	30.5 8/18-24/40
Harer, Idaho	400' downstream from Sheep Creek, 5 mi. east of Dingle	1940-47	2,400 5/7/43	44 8/20-22/40	59 Aug. 1940	45 8/18-24/40

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TABLE 3 - Continued

HYDROLOGIC DATA

Station	Location	Period of Record	Flow in Second Feet & Date of Occurrence			
			Maximum	Minimum	Monthly	Lowest Mean Flow Seven Consecutive Days
Alexander, Idaho	600' downstream from Soda Electric Plant	1940-47	1,550 4/4/43	35 12/31/39	169 Oct. 1944	104 1/6-12/40
Freston, Idaho	600' below head gates of West Cache Canal	1944-47	3,800 6/11/45	14 7/4/44	273 Oct. 1944	190 10/1-7/44
Collinston, Utah	2,000' below Cutler Dam, 800' below Cutler Power Plant	1940-47	6,210 5/10/45	15 5/20/41	20 Aug. 1940	17 9/10-16/41
<u>MILL CREEK</u>						
Evanston, Wyoming	1.8 mi. downstream from Utah-Wyoming State line, 18.8 mi. s.e. of Evanston	1943-47	430 5/3/47	3.3 9/14-15/44	4 Sept. 1944	3.5 9/11-17/44
<u>SULPHUR CREEK</u>						
Evanston, Wyoming	4.8 mi. upstream from mouth of Evanston	1943-47	740 4/20/45	0.2 19/14-18/43	0.4 Sept. 1944	0.25 9/13-19/43
<u>MONTPELIER CREEK</u>						
Montpelier, Idaho	3½ mi. downstream from South Fork, 3 mi. East of Montpelier	1943-47	134 4/24/43	1.5 1/20/44	4.5 Jan. 1943	4 3/16-22/43
<u>BEAR LAKE OUTLET CANAL</u>						
Laris, Idaho	2,000' downstream from head (at dike), 3 mi. Southeast of Laris	1947	1,450 8/15/47	8 4/27-5/19	11 Apr. 1947	8 4/27-5/19/47

TABLE 3 - Continued

HYDROLOGIC DATA

Station	Location	Period of Record	Flow in Second Feet & Date of Occurrence			
			Maximum	Minimum	Lowest Mean Flow Monthly	Seven Consecutive Days
<u>CUB RIVER</u>						
Freston, Idaho	0.2 mi. upstream from head gates Cub River-Worm Creek Canal	1941-47	705 6/2/43	14 12/20/40	16 Jan. 1941	15 12/16-22/40
Franklin, Idaho	1½ mi. upstream from Maple Creek, 2½ mi. north of Franklin	1941-47	617 6/2/43	1.4 8/25/44	2 July 1941 Aug. 1942	1.6 7/30-8/5/42
Freston, Idaho	½ mi. upstream from divide between Cub River and Worm Creek Basins(Worm Creek Canal)	1944-47	Total flow through canal for water year (maximum year) 6,037.8 Second - foot - days in 1945			
<u>LITTLE BEAR RIVER</u>						
Paradise, Utah	1 mi. upstream from backwater of Hyrum Res., 2 mi. N of Paradise	1940-47	352 6/6/45	4 8/14/40	6.6 Aug. 1940	6 8/11-17/40
Hyrum, Utah	1½ mi. below Hyrum Dam, 2 mi. west of Hyrum	1940-47	342 6/7/45	1 7/1-27/40	1.1 July 1940	1 7/1-27/40
Malad, Idaho	1 3/8 mi. upstream from Samaria Dam, 5 3/4 mi. NW of Malad	1941-47	40 7/21/41	5.8 11/24/40	5.9 Nov. 1940	5.83 11/24-30/40
Woodruff, Idaho	at bridge on county road at Woodruff, 2½ mi. north	1940-47	500 1/22-23/43	15 7/15-16/40	16.6 July 1940	16 7/10-16/40

TABLE 3 - Continued

HYDROLOGIC DATA

Station	Location	Period of Record	Flow in Second Feet & Date of Occurrence			
			Maximum	Minimum	Lowest Mean Flow Monthly	Seven Consecutive Days
<u>STRAWBERRY TUNNEL</u>						
			Total Water Imported for Water Year (maximum year)			
			30,139.5 Second - foot - days in 1947			
<u>WEBER RIVER</u>						
W. Portal, Utah	40' downstream from W. Portal of Tunnel	1947				
Oakley, Utah	1.4 mi. downstream from South Fork, 3 1/4 mi. NE of Oakley	1940-47	1,720 6/11/42	16 3/12/41	38 Jan. 1940	37 12/22-28/39
Coalville, Utah	At bridge 1 1/2 mi. upstream from high water contour of Echo Reservoir	1940-47	1,530 6/3/44	11 8/1/40	21.3 Aug. 1940	13 7/31-8/6/40
Echo, Utah	900' upstream from Echo Creek, 2900' downstream from Echo Dam	1940-47	2,370 6/2/43	2 4/3-13/40	4 Feb. 1941	2 4/3-13/40
Devils Slide, Utah	350' downstream from Highway Underpass on	1940-47	2,510 6/3/44	26 12/18/46	45 Nov. 1946	35 11/16-22/46
Gateway, Utah	800' downstream from U.I.R.R. Bridge, 2500'E. of Gateway section house	1940-47	3,270 6/4/44	87 12/18/46	142 Feb. 1940	115 1/26-2/1/40
Flain City, Utah	At County Highway Bridge, 1 mi. downstream from Four Mile Creek	1940-47	3,740 6/4/44	8 8/13/40	11.7 Aug. 1940	10 8/11-17/40

TABLE 3 - Continued

HYDROLOGIC DATA

Station	Location	Period of Record	Flow in Second Feet & Date of Occurrence			
			Maximum	Minimum	Lowest Mean Flow	
					Monthly	Seven Consecutive Days
<u>OGDEN RIVER</u>						
Ogden, Utah	2,000' downstream from Pine View Dam	1940-47	2,290 6/7/45	0 2/9-15/43	0.3 Feb. 1944	0 2/9-15/43
Huntsville, Utah	1 mi. upstream from Huntsville Mountain Canal, 5½ mi. E. of Huntsville	1940-47	995 4/23/43	22 11/23/40	26.8 Aug. 1940	26 8/15-21/40
Lehi, Utah	At Narrows, 7½ mi. downstream from Utah Lake, 5½ mi. NW of Lehi	1940-47	<u>JORDAN RIVER</u> 387 7/21/47	0 4/30-5/2/45	1 Feb. 1942	1 2/1-28/42
Salt Lake City, Utah	¼ mi. downstream from Highway Bridge on 21 So. Street, Salt Lake	1943-47	384 6/3/44	13 4/9-13/43 7/19/44	60 April 1943	15 4/9-15/43
<u>SPANISH FORK</u>						
Thistle, Utah	600' downstream from confluence of Soldier Fork & Thistle Creek	1940-47	638 5/10/44	17 8/6/40	24 Aug. 1940	21 8/12-18/40
Castilla, Utah	600' upstream from Cold Springs outlet, 1 mi. upstream from Reclamation Dam	1940-47	923 5/10/44	24 1/19/43	56 Jan. 1944	46 1/8-14/44

TABLE 3 - Continued

HYDROLOGIC DATA

Station	Location	Period of Record	Flow in Second Feet & Date of Occurrence			
			Maximum	Minimum	Monthly	Lowest Mean Flow Seven Consecutive Days
Lake Shore, Utah	400' downstream from bridge, 1 mi. upstream from mouth	1940-47	720 5/15/44	0 9/6-12/43 9/4-10/47	0.2 July 1947	0 9/6-12/43 9/4-10/47
<u>PROVO RIVER</u>						
Vivian Park, Utah	$\frac{1}{2}$ mi. downstream from North Fork 3,500' north east of Vivian Park	1940-47	1,200 6/11/44	42 11/27/46	114 Aug. 1940	106 8/28-9/3/40
Provo, Utah	1,300' downstream from bridge on State Highway 114	1940-47	987 12/0/46	0 6/16-19/40 7/6-7/41	1.7 July 1940	0.7 7/6-12/41
<u>WEBER - PROVO DIVERSION CANAL</u>						
Woodland, Utah	100' upstream from outlet to Provo River	1940-47	Total water for water year (maximum year) 32,801.7 Second - foot - days in 1947			
<u>AMERICAN FORK</u>						
American Fork, Utah	500' downstream from Rock Creek, 1,000' upstream from upper plant intake	1947	399 5/7/47	15 12/17-18-29-	17 Jan. 1947	16 1/20-2/8/47

TABLE 4

Population Trends for Idaho, Nevada, Utah and Wyoming
and for the Counties in the Great Salt Lake Basin
(Data to which percentages were applied to obtain the figures in Table 5)
(Data from Department of Commerce, Bureau of the Census)

County	1900	1920	1940	1950	% Change 1940-50
Cache	18,139	26,992	29,797	33,496	12.4
Davis	7,996	11,450	15,784	30,771	95.0
Morgan	2,045	2,542	2,611	2,517	-3.6
Rich	1,946	1,890	2,028	1,664	-17.9
Salt Lake	77,725	159,282	211,623	274,208	29.6
Weber	25,239	43,463	56,714	83,032	46.4
Tooele	7,361	7,965	9,133	14,577	59.6
Box Elder	10,009	18,788	18,832	20,001	6.2
Utah	32,456	40,792	57,382	80,967	41.1
Summit	9,439	7,862	8,714	6,703	-23.1
Wasatch	4,736	4,625	5,754	5,563	-3.3
Jaub	10,082	9,871	7,392	5,971	-19.2
Sanpete	16,313	17,505	16,063	13,878	-13.6
State of Utah	276,749	449,396	550,310	686,797	24.8
Bear Lake	7,051	8,783	7,911	6,825	-13.7
Franklin	--	8,650	10,229	9,749	-4.7
Oneida	8,933	6,723	5,417	4,380	-19.1
Bannock	11,702	27,532	34,759	41,108	18.3
Caribou*	--	2,191	2,284	5,574	144.0
Cassia	3,951	15,659	14,430	14,402	-0.2
Power	--	5,105	3,965	3,976	0.3
State of Idaho	161,772	431,866	524,873	585,092	11.5
Elko	5,688	8,083	10,912	11,632	6.6
White Pine	1,961	8,935	12,377	9,390	-24.1
State of Nevada	42,335	77,407	110,247	158,283	43.6
Lincoln	--	12,487	10,286	8,973	-12.8
Uinta	12,223	6,611	7,223	7,295	1.0
State of Wyoming	92,531	194,402	250,742	288,800	15.2

*Large gain probably due to change in County Boundaries

TABLE 5

Trend of Population for the Great Salt Lake Basin Showing Portion of Basin Population Contributed by Each County and the Basin Total for the Period 1900 to 1950

(Data from the Department of Commerce, Bureau of the Census)

County	% County* Population in Basin	1900	1920	1940	1950
Bear Lake	100	7,051	8,783	7,911	6,825
Cache	100	18,139	26,992	29,797	33,496
Davis	100	7,996	11,450	15,784	30,771
Franklin	100	--**	8,650	10,229	9,749
Morgan	100	2,045	2,542	2,611	2,517
Rich	100	1,946	1,890	2,028	1,664
Salt Lake	100	77,725	159,282	211,623	274,208
Weber	100	25,239	43,463	56,714	83,032
Oneida	99.9	8,923	6,716	5,411	4,375
Tooele	99.9	7,359	7,962	9,130	14,572
Utah	99.9	32,437	40,769	57,349	80,920
Summit	99.8	9,424	17,849	8,700	6,692
Box Elder	98.4	9,850	18,488	18,532	19,682
Wasatch	95.1	4,505	4,399	5,473	5,291
Uinta	60.2	7,358	3,980	4,348	4,391
Juab	54.0	5,442	5,328	3,990	3,223
Caribou	52.8	--**	1,156	1,205	2,941
White Pine	15.5	305	1,387	1,922	1,458
Lincoln	13.0	--**	1,627	1,340	1,169
Elko	8.4	476	677	914	974
Bannock	7.9	919	2,162	2,729	3,227
Sarpete	6.6	1,078	1,156	1,061	917
Power	2.3	--**	118	92	92
Cassia	0.3	11	46	42	42
Total Great Salt Lake Basin		228,228	366,872	458,935	592,228

*The percent value was obtained by determining the number of people within the Basin in each county by use of the 1940 census and determining the percent of the total 1940 county population this number represented. These percentages were then applied to the total county figures for other years to determine the portion of the Basin population contributed by each county.

**No populations were shown for these areas in the 1900 census.

TABLE 6

AREAL DISTRIBUTION OF GREAT SALT LAKE BASIN BY COUNTIES
(Data from Maps furnished by the U. S. Geological Survey)

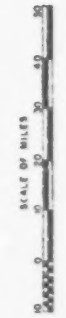
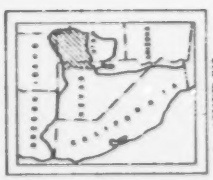
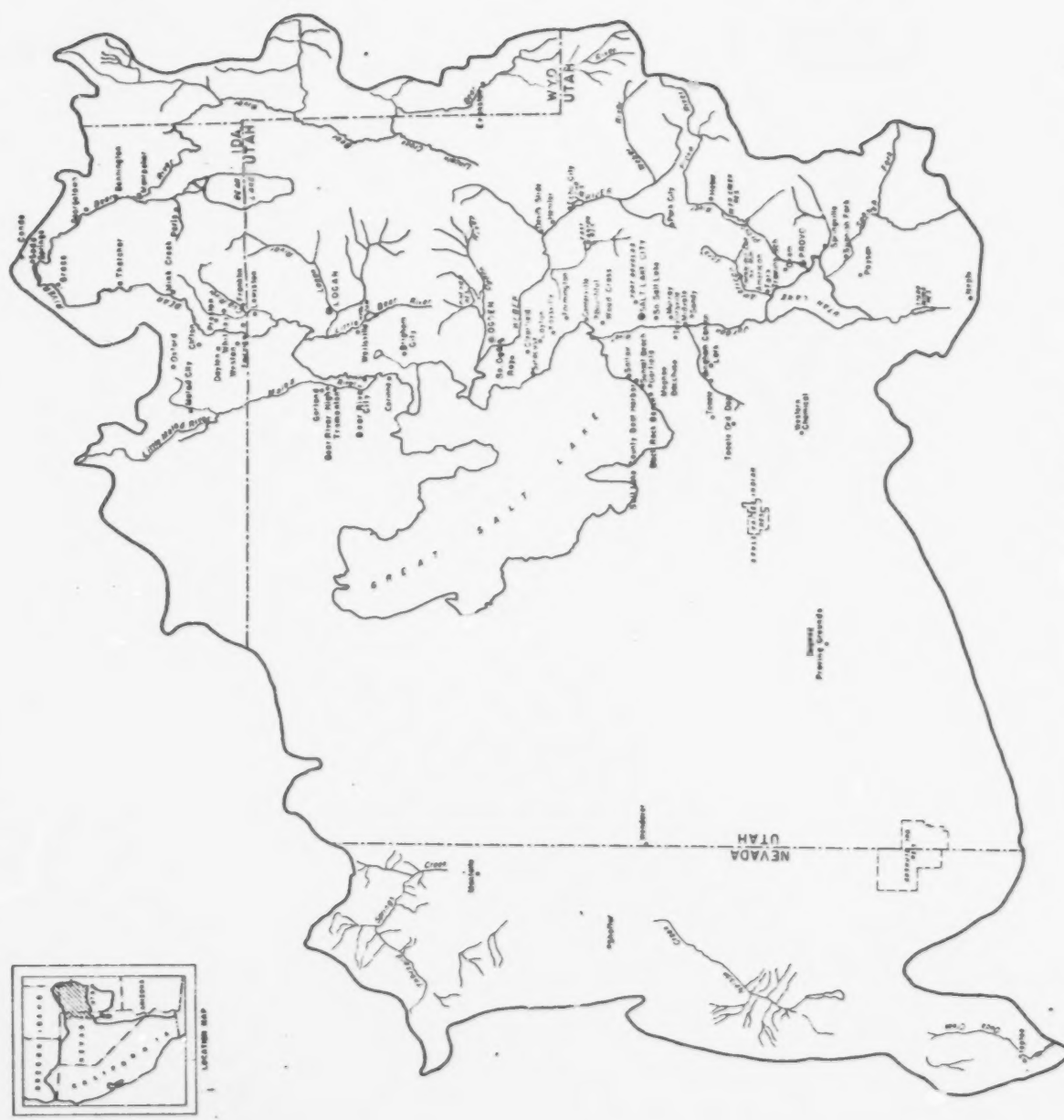
County	State	Area of County in Square Miles	Area of County in Basin in Sq. Miles	Percent of County in Basin	Percent of Basin Represented by County
Bear Lake	Idaho	925	925	100	2.9
Cache	Utah	1,164	1,164	100	3.6
Davis	"	275	275	100	0.8
Franklin	Idaho	556	556	100	1.7
Morgan	Utah	626	626	100	1.9
Rich	"	1,031	1,031	100	3.2
Salt Lake	"	756	756	100	2.3
Weber	"	541	541	100	1.7
Tooele	"	6,849	6,800	99	21.0
Oneida	Idaho	1,209	1,173	97	3.6
Box Elder	Utah	5,444	5,082	93	15.7
Utah	"	2,034	1,901	93	5.9
Summit	"	1,870	1,353	72	4.2
Wasatch	"	1,167	492	42	1.5
Juab	"	3,401	1,251	37	3.9
Elko	Nevada	17,059	4,251	25	13.1
Lincoln	Wyoming	4,227	1,057	25	3.3
Uinta	"	2,094	503	24	1.6
Bannock	Idaho	1,837	367	20	1.1
White Pine	Nevada	8,795	1,790	20	5.5
Caribou	Idaho	1,263	114	9	0.4
Cassia	"	2,595	182	7	0.6
Sanpete	Utah	1,616	96	6	0.3
Power	Idaho	1,391	70	5	0.2
Totals			32,356		100

TABLE 7
Temperature and Precipitation Summary for Selected Stations
of the Great Salt Lake Basin

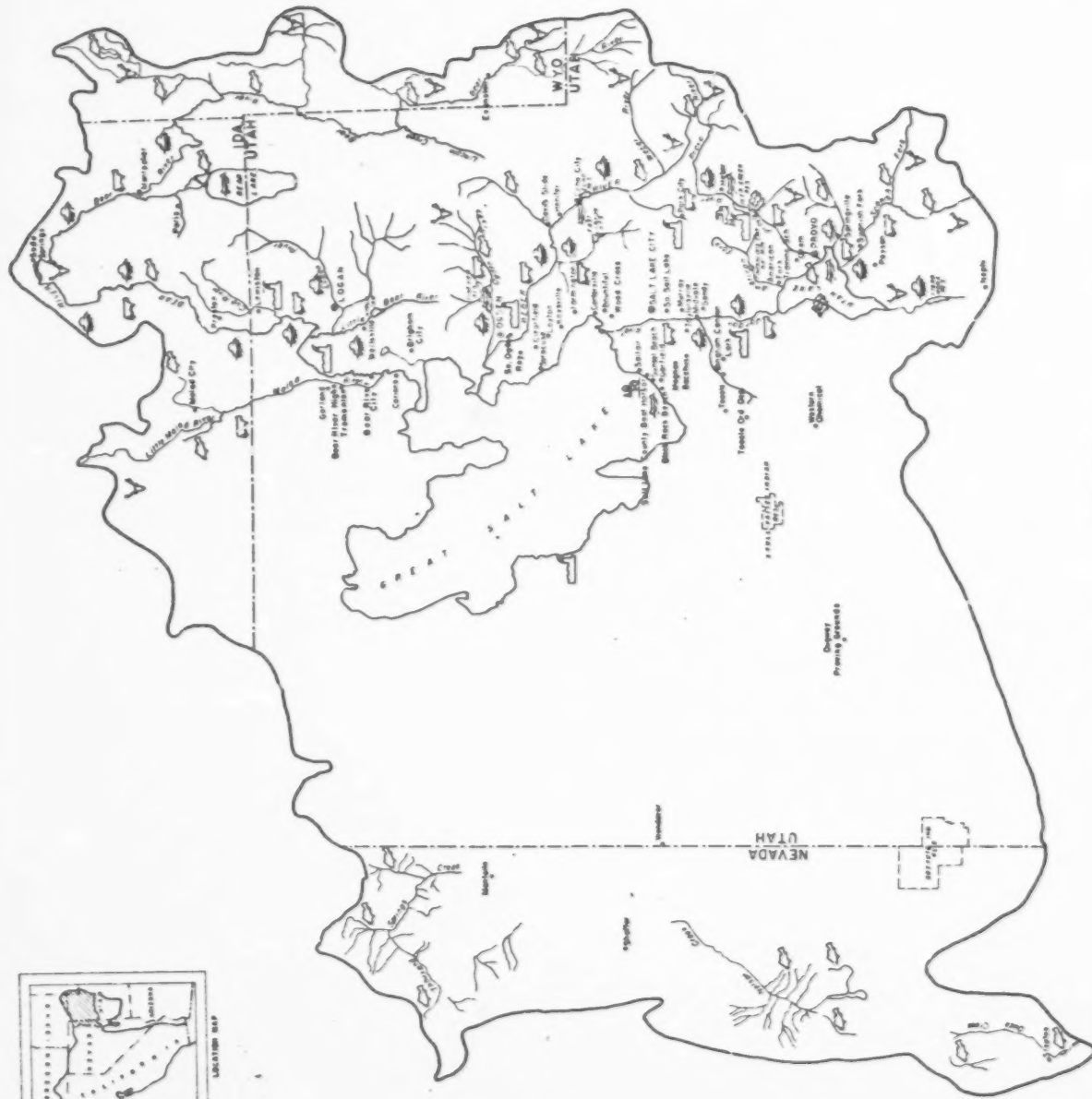
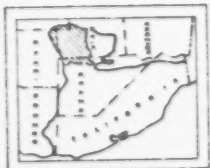
(Data from Climatic Summary of the United States by U. S.
Department of Commerce, Weather Bureau)

Station	Elevation Feet	Precipitation		Temperature-°F.			Average Growing Season- Days
		Average Annual	May-Sept.	Mean Annual	Max.	Min.	
Grace, Idaho	5,400	14.17	5.94	43.4	103	-34	111
Malad, Idaho	4,700	15.29	5.73	45.6	108	-25	123
Montpelier, Idaho	5,940	13.87	5.39	41.8	102	-34	86
Montello, Nevada	4,877	5.40	2.10	46.3	111	-34	113
Brigham, Utah	4,220	17.71	5.50	50.3	108	-27	167
Coalville, Utah	5,650	13.62	5.13	43.7	101	-40	79
Elberta, Utah	4,650	11.10	4.20	50.0	105	-28	133
Heber, Utah	5,593	17.00	5.02	43.9	100	-38	83
Ibapah, Utah	5,288	12.76	8.09	45.1	104	-32	84
Logan, Utah	4,780	16.44	5.38	48.0	102	-25	158
Ogden, Utah	4,310	16.09	4.70	50.0	102	-18	83
Provo, Utah	4,650	15.19	4.82	49.0	110	-35	122
Saltair, Utah	4,220	14.02	4.89	51.1	99	-9	194
Salt Lake City, Utah	4,260	16.13	5.06	51.6	105	-20	187
Snowville, Utah	5,440	10.69	3.44	45.2	106	-35	87
Tooele, Utah	4,820	16.60	5.29	50.7	104	-16	164
Wendover, Utah	4,240	4.92	2.42	52.8	109	-19	153
Woodruff, Utah	6,340	9.52	4.57	38.7	102	-50	54

GREAT SALT LAKE BASIN
 GENERAL REFERENCE MAP
 FEDERAL SECURITY AGENCY
 Public Health Service
 DIVISION OF WATER POLLUTION CONTROL
 Map No. 1



27-A



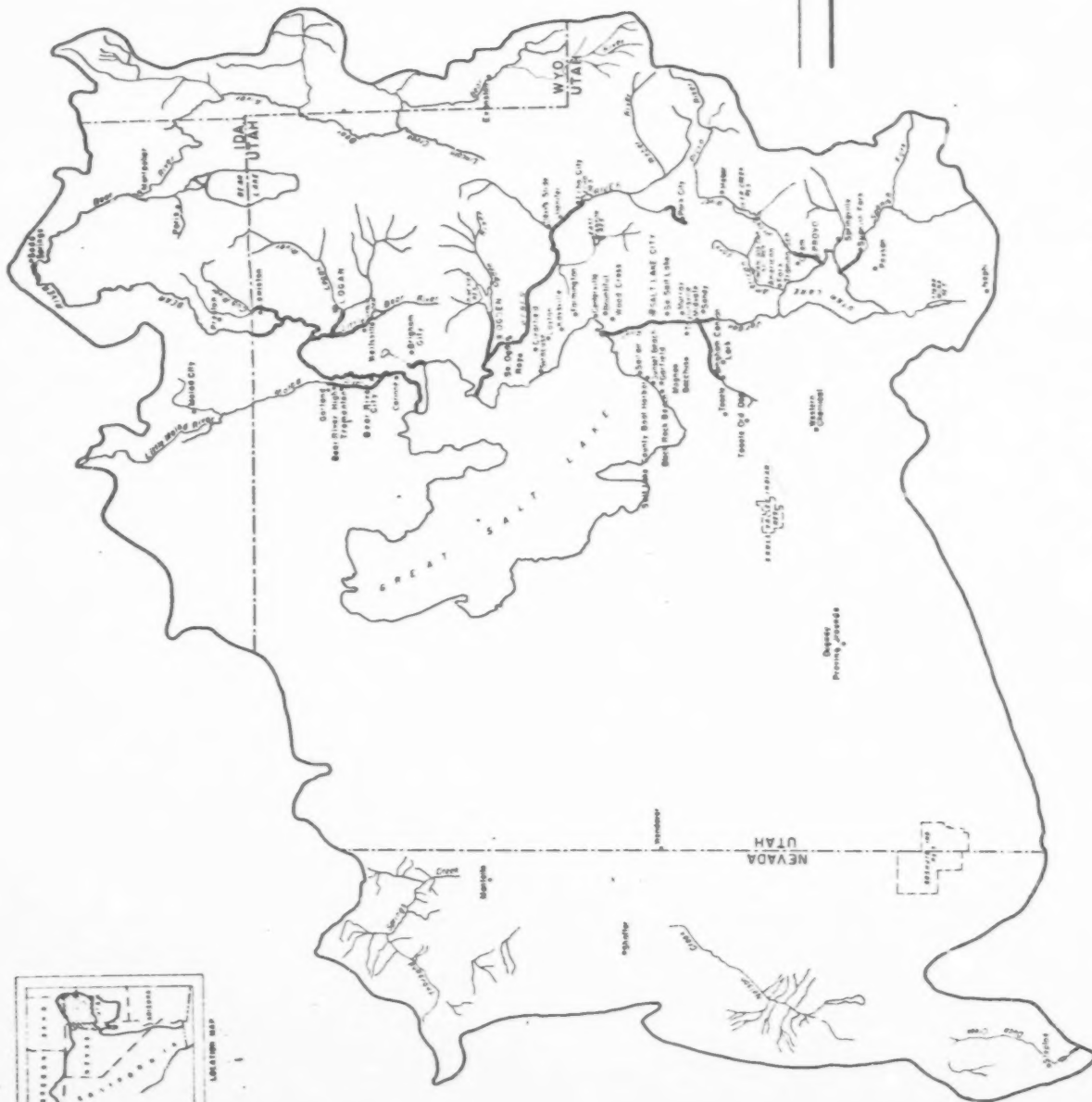
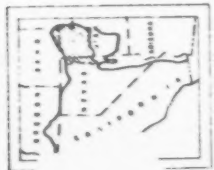
DOMESTIC WATER SUPPLY
INDUSTRIAL WATER SUPPLY
LIVESTOCK
IRRIGATION
COMMERCIAL FISHING
GAME FISHING
OTHER RECREATIONS
WILDLIFE
BATHING WATER

GREAT SALT LAKE BASIN
EXISTING PRIMARY WATER USES
FEDERAL SECURITY AGENCY
PUBLIC HEALTH SERVICE
DIVISION OF WATER POLLUTION CONTROL
MAP No. 2



28-A

600-101500

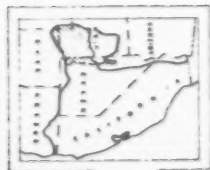


SATISFACTORY FOR ALL EXISTING WATER USES
 UNSATISFACTORY FOR SOME EXISTING WATER USES

GREAT SALT LAKE BASIN
 PRESENT STREAM STATUS
 FEDERAL SECURITY AGENCY
 Public Health Service
 DIVISION OF WATER POLLUTION CONTROL
 Map No. 3

29-A





SOURCES OF MUNICIPAL POLLUTION
POPULATION EQUIVALENT (800)
OF
WASTES DISCHARGED TO STREAM

- 1,000 OR LESS
- 1,001 TO 10,000
- 10,001 TO 100,000
- 100,001 AND OVER

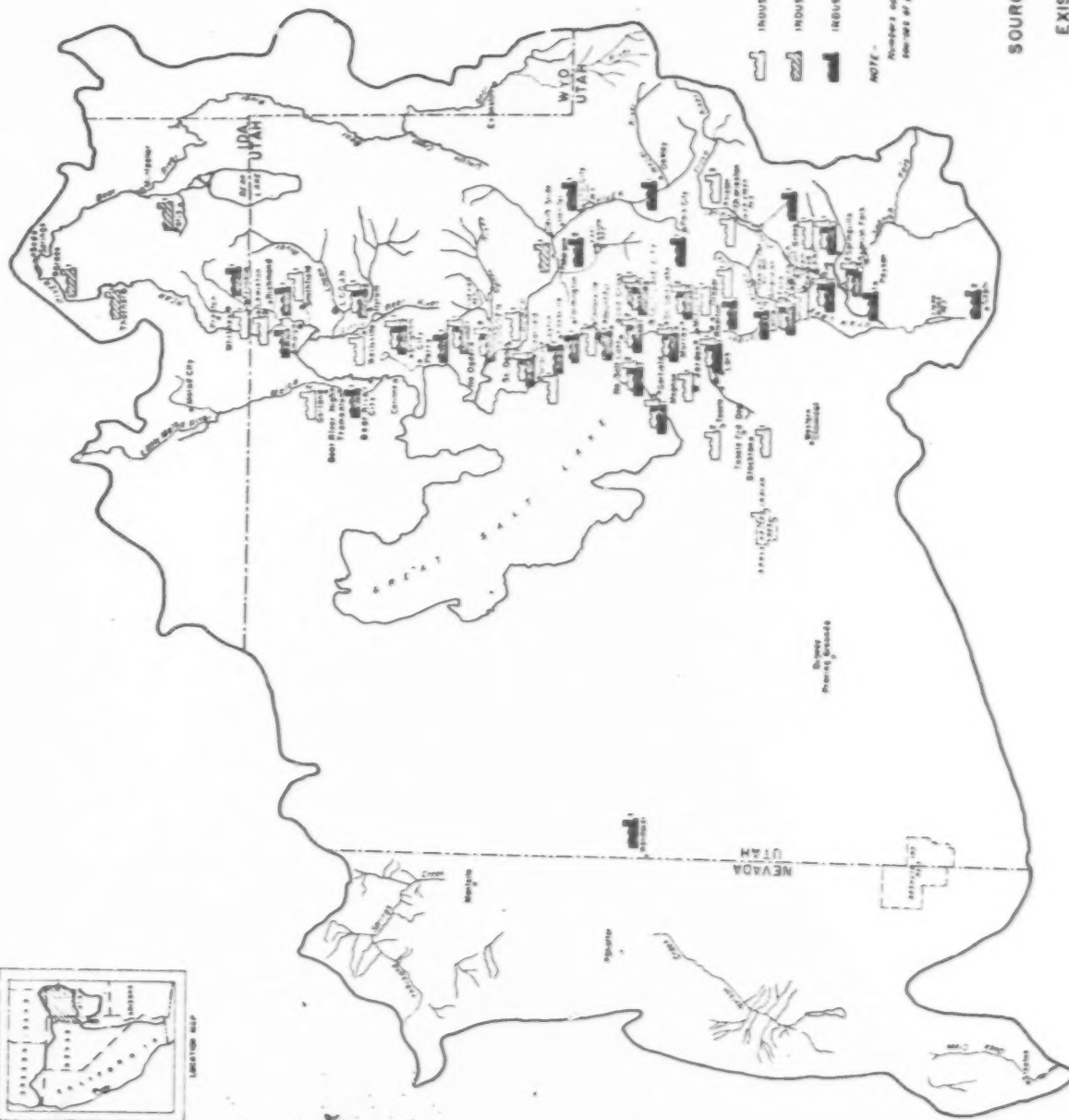
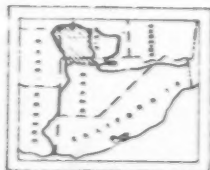
EXISTING TREATMENT FACILITIES

- SECONDARY
- PRIMARY
- NO TREATMENT

GREAT SALT LAKE BASIN SOURCES OF MUNICIPAL POLLUTION AND EXISTING TREATMENT FACILITIES

FEDERAL SECURITY AGENCY
Public Health Service
DIVISION OF WATER POLLUTION CONTROL
WAS 16-6

SCALE OF MILES
0 10 20 30
30-A



INDUSTRIES WITH TREATMENT FACILITIES

INDUSTRIES WITH TREATMENT FACILITIES UNTERMINED

INDUSTRIES WITH NO TREATMENT FACILITIES

NOTE:

Numbers appearing to symbols indicate total number of industrial sources of pollution in the area in the category designated

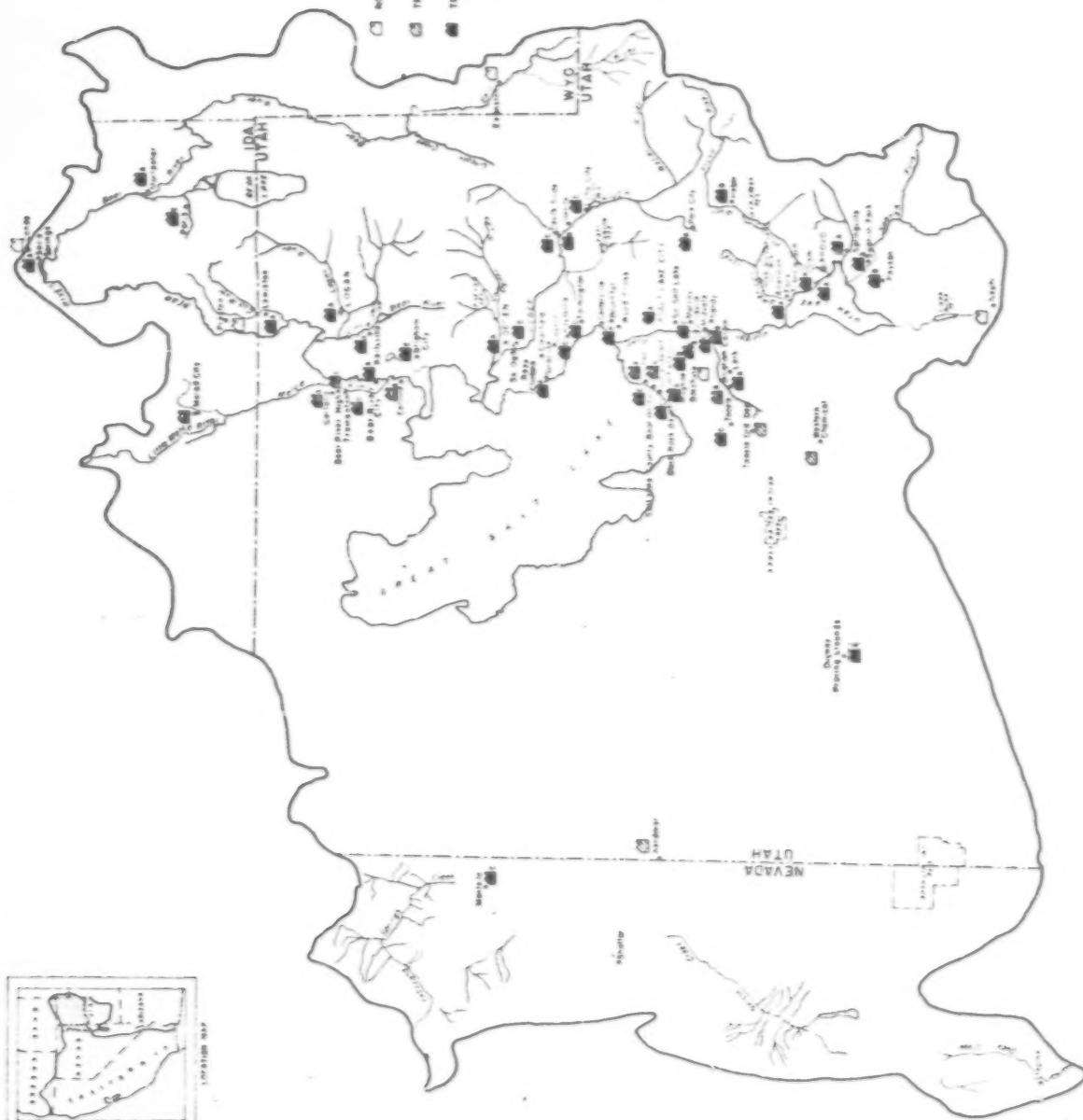
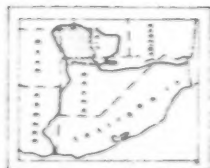
GREAT SALT LAKE BASIN SOURCES OF INDUSTRIAL POLLUTION AND EXISTING TREATMENT FACILITIES

FEDERAL SECURITY AGENCY
Public Health Service
DIVISION OF WATER POLLUTION CONTROL
Map No. 5

SPR 60-151000



31-A



- NO TREATMENT NEEDED
- ◻ TREATMENT NEEDED
- ◻ TREATMENT NEEDED

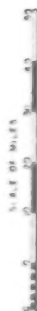
TREATMENT NEEDS INDICATED BY LETTERS
APPEARING NEAR "TREATMENT NEEDED" SYMBOLS,
AS FOLLOWS:

- A. NEW PLANT
- B. ENLARGEMENTS OR ADDITIONS TO EXISTING PLANT
- C. REPLACE EXISTING PLANT
- CL. CHLORINATION

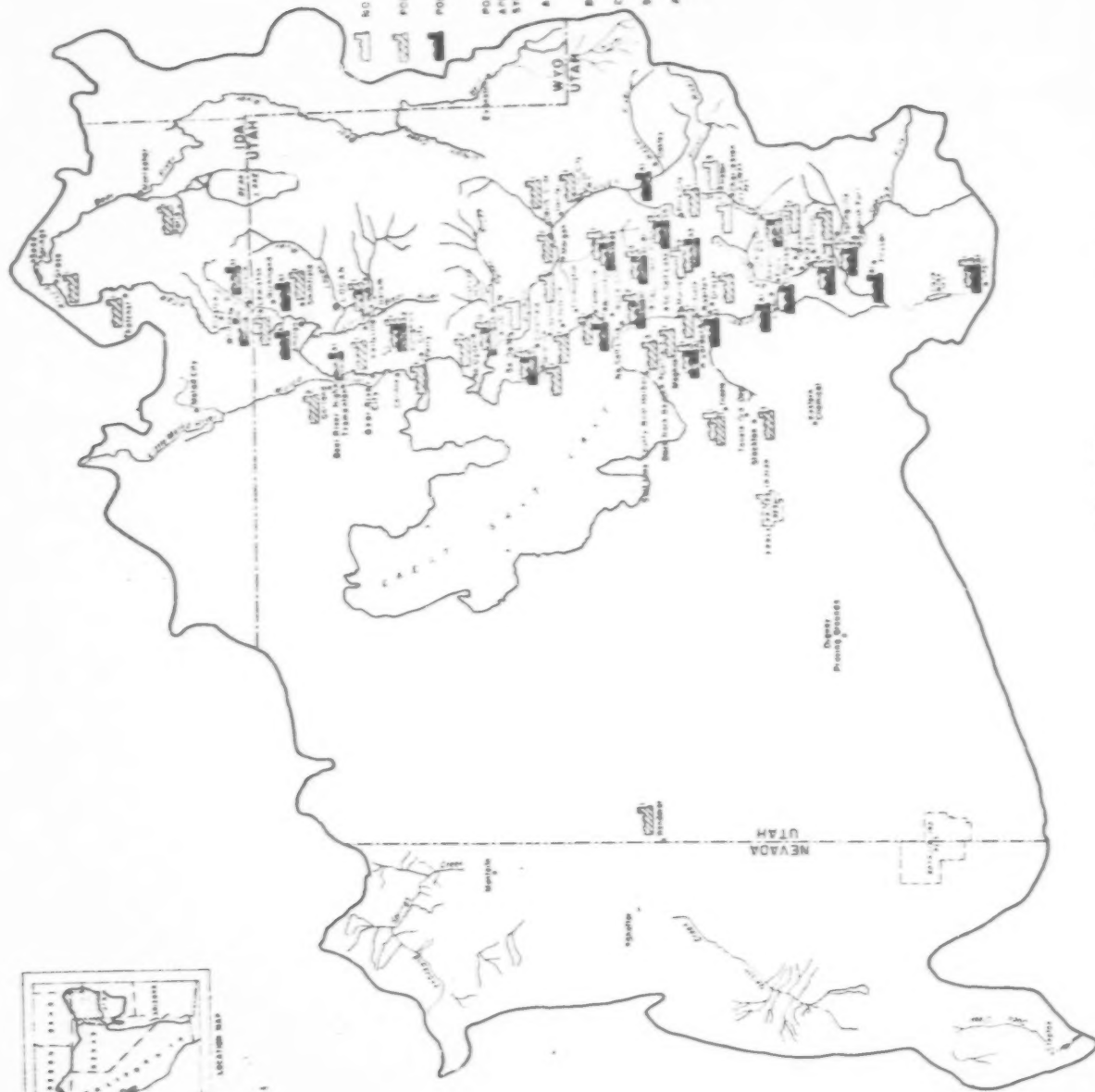
GREAT SALT LAKE BASIN
MUNICIPAL
WASTE TREATMENT NEEDS

FEDERAL SECURITY AGENCY
Public Health Service
DIVISION OF WATER POLLUTION CONTROL
WPD No. 5

OPS 88-171502



52-A



NO POLLUTION ABATEMENT NEEDED

POLLUTION ABATEMENT NEEDED UNDETERMINED

POLL ON ABATEMENT NEEDED

POLLUTION ABATEMENT NEEDED INDICATED BY LETTERS APPEARING NEAR POLLUTION ABATEMENT NEEDED SYMBOLS AS FOLLOWS

- A NEW TREATMENT PLANT OR OTHER POLLUTION CONTROL MEASURES
- B ENLARGEMENTS OR ADDITIONS TO EXISTING PLANT
- C REPLACE EXISTING PLANT
- D CONNECTION TO MUNICIPAL SEWER SYSTEM

NOTE—

Numbers 1 through 5 are to be used where appropriate to indicate the number of separate abatement needs in the category designated

GREAT SALT LAKE BASIN INDUSTRIAL POLLUTION ABATEMENT NEEDS

FEDERAL SECURITY AGENCY
PLANT HEALTH SERVICE
DIVISION OF WATER POLLUTION CONTROL
WASH DC 20540

OM-10-111000

33-A

